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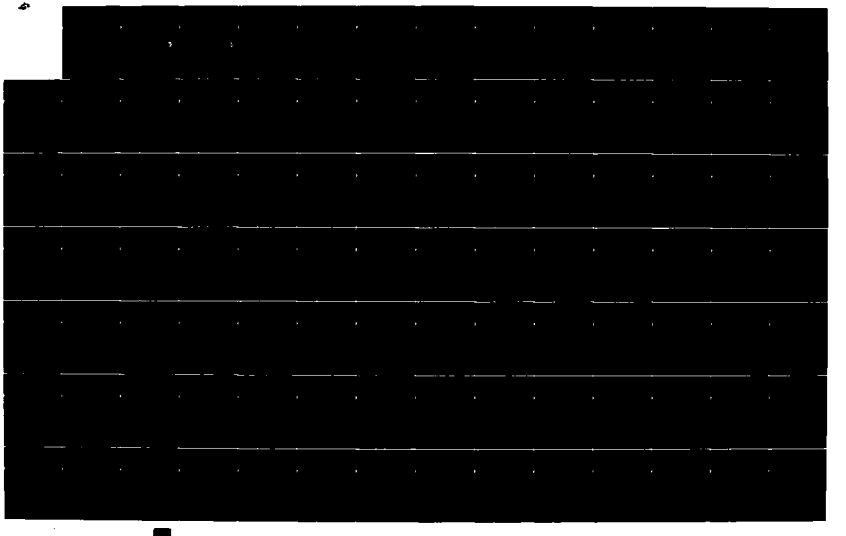

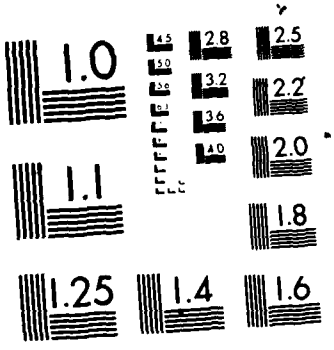

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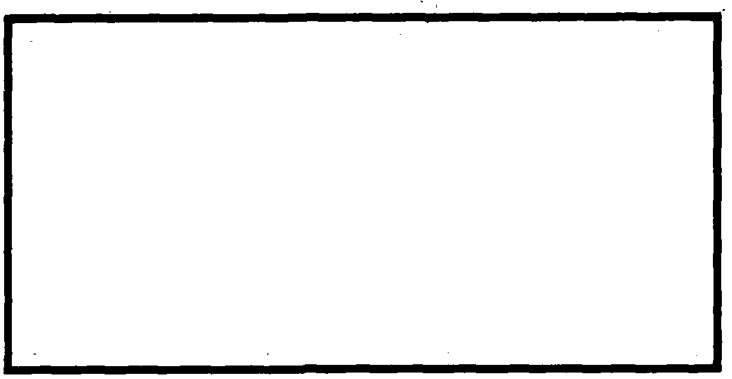

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This report describes the third in a series of command and control (C^2) experiments designed to examine the influence of C^2 organization on system performance. The experiments are part of a larger program, whose purpose is to define, measure, and identify determinants of C^2 effectiveness. The experimental effort is jointly sponsored by the Defense Communications Agency (DCA) and the U.S. Naval Postgraduate School (NPS), with actual experimental trials being conducted in the NPS C^2 Wargame Analysis and Research Laboratory (WARLAB) using NPS officer-students as experimental subjects.

Each of the experiments in the series has examined the impact of a basic C^2 attribute--connectivity, centrality, and rol--upon C^2 effectiveness. The first set of experiments treated C^2 connectivity, while the second treated centrality; the current set examines the impact of role and specialization. →

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1985 C^2 Effectiveness Experiments

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EXECUTIVE SUMMARY

This report describes the third in a series of command and control (C^2) experiments designed to examine the influence of C^2 organization on system performance. The experiments are part of a larger program, whose purpose is to define, measure, and identify determinants of C^2 effectiveness. The experimental effort is jointly sponsored by the Defense Communications Agency (DCA) and the U.S. Naval Postgraduate School (NPS), with actual experimental trials being conducted in the NPS C^2 Wargame Analysis and Research Laboratory (WARLAB) using NPS officer-students as experimental subjects.

Each of the experiments in the series has examined the impact of a basic C^2 attribute--connectivity, centrality, and role--upon C^2 effectiveness. The first set of experiments treated C^2 connectivity, while the second treated centrality; the current set examines the impact of role and specialization.

EXPERIMENTAL DESIGN

The experimental subjects were divided into two groups (A and B) with each group being subdivided into cells representing nodes in the command structure. The experimental command structure consisted of five command nodes: Commander, Second Fleet (COMSECONDFLT), three Carrier Battle Groups (CVBGs), and CONTROL/Commander-In-Chief Atlantic Fleet (CINCLANTFLT). Performance measures were taken for all except CONTROL/CINCLANTFLT. Unlike previous experiments where students played various roles throughout the experimental runs, in this experiment the students played the same roles throughout (i.e., BG commander, action officer, communicator, etc.).

The scenario setting is a battle force consisting of three CVBGs operating under a numbered fleet commander in a high threat environment. Experimental trials are conducted in both a clear and a disturbed communications environment. As with previous experiments, these experiments examine the impact of varying organizational structures on the performance of the command nodes and the force as a whole.

The C^2 performance of the experimental cells under varying conditions is scored using measures of performance derived from the Headquarters Effectiveness Assessment Tool (HEAT). The performance measures are tailored to accommodate inherent simulation and laboratory artificialities and collectible data. Tactical battle outcomes, provided by the simulation, are also used to measure group performance.

Previous experiments compared the performance of geographic vs. functional organization. The geographic organization consisted of each CVBG being responsible for all warfare areas (i.e., AAW, ASW, ASUW) plus STRIKE within its geographic area of responsibility. The functional organization consisted of each CVBG being responsible for one of the three warfare areas for the entire area of operations with the Officer in Tactical Command (OTC) performing the function of Combined Warfare Commander (CWC).

The current experiments compare the performance of higher and lower echelons (i.e., Fleet and CVBG nodes) in the conduct of planning and battle management tasks. They also compare battle force performance with the force configured in either a geographic organization or a hybrid combination of geographic and functional organization. In the hybrid organization, the CVBGs are organized geographically with two exceptions: STRIKE planning and execution is centrally controlled by one of the CVBGs and another CVBG is responsible for AAW coordination. As before, in the geographic organization each CVBG is responsible

for all warfare areas within its geographic area. In addition, the STRIKE function is coordinated at the Fleet node but execution is the responsibility of the individual CVBGs.

EXPERIMENTAL TRIAL SEQUENCE

For these experiments, each of two groups participated in a series of experimental trials. To avoid possible confounding effects from learning, and to minimize impact from unauthorized crosstalk between groups, experimental trials were sequenced as shown in Figure ES-1, which presents an overview of the experimental design, including session structure and trial sequence and content. The overall structure of an individual experimental trial required the command organization to work through two complete planning cycles. Communications disturbance occurred randomly during the planning and action cycles of each simulated day. The disturbance occupied approximately ten percent of the available circuit-minutes so that disturbance could make a noticeable impact. If the disturbance occurred at a node collocated with STRIKE, STRIKE was likewise disturbed to prevent the node from using the STRIKE network as a communications channel.

FINDINGS

The experiment design was based on the assumption that the two groups would be of like population and would react similarly to identical (or nearly identical) stimuli. As determined from the causal influences, each group behaved in a distinctly different manner. Group A was reactive, that is they tended to react to ORANGE actions as they occurred, while Group B was proactive, that is they attempted to anticipate, predict, and avoid or allow for ORANGE actions. Generally, proactive behavior is far more complex than reactive.

o structure of an individual session

o experimental trial sequence and composition

GROUP A	GROUP B
− 2-prong counterforce → attempt envelopment; geographic; disturb, disturb disturb, disturb	± simple counterforce → escorted counterforce; hybrid; clear, disturb clear, disturb
− simple counterforce → attempt envelopment; hybrid; disturb, clear clear, disturb	± simple counterforce → 2-prong counterforce; geographic; clear, disturb clear, disturb
+ 2-prong counterforce → 2-prong counterforce; geographic; clear, disturb clear, clear	− 2-prong counterforce → escorted counterforce; geographic; disturb, disturb disturb, disturb
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± simple counterforce → escorted counterforce; geographic; clear, disturb clear, disturb	± 2-prong counterforce → escorted counterforce; geographic; disturb, clear disturb, clear
+ simple counterforce → simple counterforce; geographic; clear, clear clear, clear	+ 2-prong counterforce → simple counterforce; geographic; disburb, clear disturb, disturb

Key

Day 1 Outcome			
Orange Intent Day 1		Orange Intent Day 4	
Blue C^2 Structure			
Plan 1	Act 1	Plan 4	Act 4

+ favors Blue,
− favors Orange,
± favors mixed.

Figure ES-1. Overview of Experimental Design

As a result of these differences, overall performance results tend to reflect an averaging of two different populations rather than a representation of a homogeneous population. Therefore the analysis includes separate group performance results and focuses on the performance of the groups rather than on overall performance.

The findings of this experiment can be summarized as follows:

- Group B (Proactive) performed better in the Fleet role than in the CVBG role.
- Group A (Reactive) performed better in the CVBG role than in the Fleet role.
- Group B generally performed better than Group A in a benign communications environment.
- Group B was more affected by communications disturbance than Group A.
- Group A was affected by the type of organizational structure while Group B was not.

The last item is perhaps the most interesting. The effect of going from hybrid to geographic organization had a positive effect on Group A's battle management function but a negative effect on its planning function, which is basically consistent with the functional/geographic results. However, the lack of effect of organizational change in Group B's performance is inconsistent with expectations. This inconsistency is borne out by both regression analysis and the HEAT performance scores.

The inconsistency with expectations for the proactive group's performance can possibly be explained by its evidenced behavioral characteristics. Even in the geographic structure, the proactive group tended to manage from the center when given

the opportunity. Therefore, the expected difference between hybrid and geographic structures did not materialize because both structures were functionally nearly identical.

CONCLUSIONS

This set of experiments was designed and conducted to determine the effect of command echelon and centrality in the performance of planning and battle management tasks in benign and disturbed communications environments. While the findings apparently indicate that the lower echelons will be better at planning and that the degree of centrality can be used to effect a change in performance, the results are mainly inconclusive. This inconclusiveness arises mainly from the unexpected extremes of behavior displayed by the two groups, a difference for which the experiment was not designed to account.

However, the difference in behavioral characteristics between the two experimental groups confirms an earlier insight into the interaction of role and structure. The basic underlying HEAT theory states that, within a given headquarters organization, there are three main determinants of effectiveness: function, structure, and capacity. The theory holds that of the three, the largest impact on effectiveness would come from a change in function (role) followed by structure and capacity. This leverage on effectiveness is inversely proportional to the ease of accomplishing the change (i.e., function or role is the most difficult to change). Clearly, for this experiment, role did, in fact, exert the greatest leverage in effectiveness.

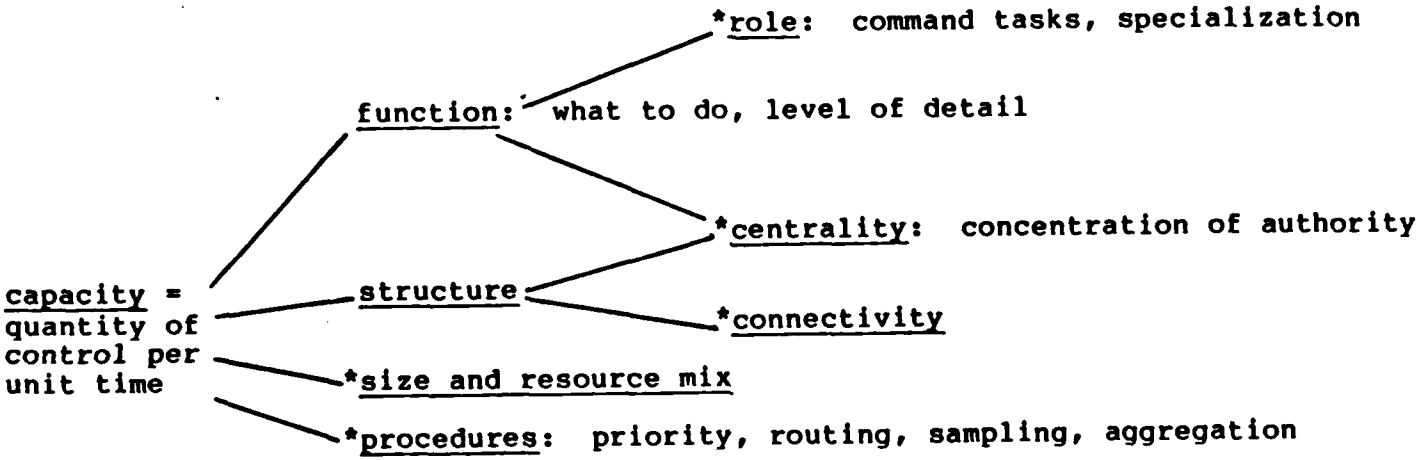
BACKGROUND

This report describes the third in a series of command and control (C^2) experiments designed to examine the influence of C^2 organization on system performance. The experiments are part of a larger program, whose purpose is to define, measure, and identify determinants of C^2 effectiveness. The experimental effort is jointly sponsored by the Defense Communications Agency (DCA) and the U.S. Naval Postgraduate School (NPS), with actual experimental trials being conducted in the NPS C^2 Wargame Analysis and Research Laboratory (WARLAB) using NPS officer-students as experimental subjects.

Each of the experiments in the series has examined the impact of a basic C^2 attribute--connectivity, centrality, and role--upon C^2 effectiveness. The logic guiding experimental purpose, sequence, and overall strategy is illustrated in Figure 1. The first set of experiments treated C^2 connectivity, while the second treated centrality; the current set examines the impact of role and specialization. Although the concepts of connectivity, centrality, and role are equivalently primitive, successive experiments have exploited insights from prior efforts:

- The centrality experiments also treated the impacts of interruptions affecting the previously-studied connectivity.
- The role experiments build upon organizational results obtained in the centrality experiments and also examine connectivity interruption.

Each experimental design has reflected emerging C^2 theory. The primary objective of each experiment has been to estimate causal influence among C^2 factors; these estimates are then used to test specific C^2 hypotheses and to construct C^2 models.



*candidate primitive attribute for early experiment

Figure 1. Using C^2 Network Attributes to Identify Experimental Topics

The experimental subjects were divided into two groups (A and B) with each group being subdivided into cells representing nodes in the command structure. The experimental command structure consisted of five command nodes: Commander, Second Fleet (COMSECONDFLT), three Carrier Battle Groups (CVBGs), and CONTROL/Commander-In-Chief Atlantic Fleet (CINCLANTFLT). Performance measures were taken for all except CONTROL/ CINCLANTFLT.

Unlike previous experiments where students played various roles throughout the experimental runs, in this experiment the students played the same roles throughout (i.e., BG commander, action officer, communicator, etc.). It was initially believed that the rotation among roles would control for personality variances among the players. However, after two experiments, it appeared that the dominant personality or most knowledgeable individual, regardless of assigned role, either tended to take charge or provided a large amount of support to the assigned commander. This factor, plus occasional mismatches between roles and ability, produced confusion and frustration among the students. Therefore, for this experiment, the course instructor, a naval commander with extensive operational experience, using best military judgment, assigned player roles commensurate with perceived ability.

The scenario setting is a battle force consisting of three CVBGs operating under a numbered fleet commander in a high threat environment. Experimental trials are conducted in both a clear and a disturbed communications environment. As with previous experiments, these experiments examine the impact of varying organizational structures on the performance of the command nodes and the force as a whole.

The C^2 performance of the experimental cells under varying conditions is scored using measures of performance derived from the Headquarters Effectiveness Assessment Tool (HEAT). The

performance measures are tailored to accommodate inherent simulation and laboratory artificialities and collectible data. Tactical battle outcomes, provided by the simulation, are also used to measure group performance.

EXPERIMENTAL DESIGN

All experiments have been conducted in the C^2 WARLAB using officer-students at the NPS. Each group was required to comprehend a military problem, devise a solution, and then attempt to implement the solution. BLUE mission elements in descending priority were to:

- maintain sea control and usable force,
- project power ashore,
- conduct ASW operations, and
- conduct ASUW operations.

To mitigate learning effects, the experiments used a family of scenarios:

- simple counterforce - single air raid against the BLUE force;
- two-prong counterforce - two ORANGE forces (air and air or air and Surface Action Group) attacking the BLUE force from distinctly different axis of attack;
- escorted counterforce with decoy - single ORANGE air raid with fighter escorts, using decoys distinct from main force to confuse BLUE; and
- attempted envelopment - full scale multi-force, multi-directional ORANGE attack against BLUE forces.

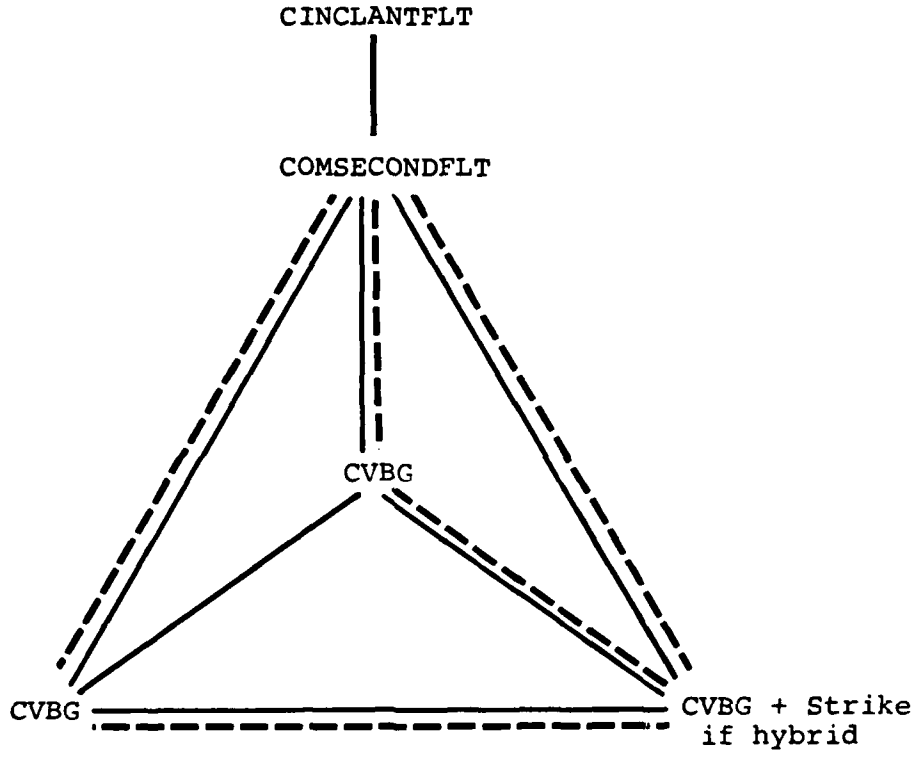
Part of the BLUE C^2 problem was to identify ORANGE options and intent from available information. Relevant experimental scenarios and situation reports (SITREPS) are contained in Appendix A.

Previous experiments compared the performance of geographic vs. functional organization. The geographic organization consisted of each CVBG being responsible for all warfare areas (i.e., AAW, ASW, ASUW) plus STRIKE within its geographic area of responsibility. The functional organization consisted of each CVBG being responsible for one of the three warfare areas for the entire area of operations with the Officer in Tactical Command (OTC) performing the function of Combined Warfare Commander (CWC).

The current experiments compare the performance of higher and lower echelons (i.e., Fleet and CVBG nodes) in the conduct of planning and battle management tasks. They also compare battle force performance with the force configured in either a geographic organization or a hybrid combination of geographic and functional organization. In the hybrid organization, the CVBGs are organized geographically with two exceptions: STRIKE planning and execution is centrally controlled by one of the CVBGs and another CVBG is responsible for AAW coordination. As before, in the geographic organization each CVBG is responsible for all warfare areas within its geographic area. In addition, the STRIKE function is coordinated at the Fleet node but execution is the responsibility of the individual CVBGs.

Experimental Communications Network

The distinction between geographical and hybrid organization is illustrated in Figure 2, which also portrays the experimental communications network. Within this network, the STRIKE node is collocated with a CVBG for hybrid organization; for geographic organization the STRIKE function operates in a coordination role and is collocated with the numbered fleet commander.



Warfare Area Communications

STRIKE Communications

Figure 2. Experimental Communications Network

Coordination among command nodes is required for either geographic or hybrid organization. For these experiments, coordination was achieved solely through an electronic mail communications network. This system provides CRT display and follow-up hard copy for all messages among command nodes. The system also saves all message traffic for subsequent analysis. Each link is a two way communications channel. Communications disturbance in these experiments is an episode in which one of the CVBGs cannot receive traffic, but can still transmit "blind." Such disturbance corresponds to "jam on the receiver" types of interference.

Physical Setting and Staffing

For this series of trials, each command node was isolated by partitions, with electronic mail being the only allowable means of communications.

The configuration for each CVBG command node included the following equipment:

- graphics display, presenting a map of the tactical situation;
- electronic status board, displaying tactical status information;
- input terminal, to receive commands and control the display; and
- electronic mail terminal, to communicate with other headquarters nodes and with the game controller (in the role of fleet commander).

The COMSECONDFLT node contained a communications terminal, graphics display on which any CVBG tactical situation display can be selected, and an input terminal. The CINCLANTFLT node contained only a communications terminal and relied solely on electronic mail for information.

Each CVBG node was staffed by a three-person team: a communicator, a game player, and an action officer in overall charge of assessment and decisions. The COMSECONDFLT team consisted of a communicator, a plotter, and an action officer in overall charge. The node at which STRIKE was located was staffed with an extra player plus an extra electronic mail terminal. The CINCLANTFLT node was staffed by a single player, who was also part of the control team. As indicated earlier, the individual players' roles are constant for the entire set of experiments.

For each experimental trial, the scenario was presented to the group, using a hard-copy SITREP to define the situation, followed by an interactive computerized wargame to present scenario development in real-time and allow them to respond to the perceived problem.

Experimental Trial Sequence

For these experiments, each of two groups participated in a series of experimental trials. To avoid possible confounding effects from learning, and to minimize impact from unauthorized crosstalk between groups, experimental trials were sequenced as shown in Figure 3, which presents an overview of the experimental design, including session structure and trial sequence and content. The overall structure of an individual experimental trial required the command organization to work through two complete planning cycles. Communications disturbance occurred randomly during the planning and action cycles of each simulated day. The disturbance occupied approximately ten percent of the available circuit-minutes so that disturbance could make a noticeable impact. If the disturbance occurred at a node collocated with STRIKE, STRIKE was likewise disturbed to prevent the node from using the STRIKE network as a communications channel.

o structure of an individual session

o experimental trial sequence and composition

GROUP A	GROUP B
- 2-prong counterforce → attempt envelopment; geographic; disturb, disturb / disturb, disturb	± simple counterforce → escorted counterforce; hybrid; clear, disturb / clear, disturb
- simple counterforce → attempt envelopment; hybrid; disturb, clear / clear, disturb	± simple counterforce → 2-prong counterforce; geographic; clear, disturb / clear, disturb
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Key

Day 1 Outcome			
Orange Intent Day 1			Orange Intent Day 4
Blue C^2 Structure			
Plan 1	Act 1	Plan 4	Act 4

+ favors Blue,
- favors Orange,
± favors mixed.

Figure 3. Overview of Experimental Design

Performance Measures

The short time duration of each trial, coupled with the tactical nature of the problem, results in a staff planning effort and plans that are not totally adequate for effectiveness comparisons between the experimental groups. Therefore, key HEAT process measures were selected and tailored for this application to provide additional measurements of performance and to establish causal relationships. The selected measures are described in Table I. HEAT data were collected by observers stationed in each cell. They were each equipped with a handheld computer that provided for a coded entry of the observed measure and its parameters. They could also enter freeformatted comments. The HEAT data thus collected were transferred to the mainframe computer at the conclusion of each session.

In addition to HEAT measures, the simulation provides for the collection of an extensive array of performance and system variables that are extremely valuable in conducting an analysis of causal influence. The complete listing of these variables is in Appendix B.

ANTICIPATED FINDINGS

The previous set of centrality experiments confirmed expectations from classic control theory and C^2 theory that, in a benign environment, a functional organization would be superior to a geographic organization in dealing with complex problems, and that the geographic would be superior in dealing with simple, or discrete problems. However when communications are disturbed, a performance crossover occurs wherein geographic appears superior for both classes of problems.

Table I. Heat Measures

TITLE	DEFINITION	PARAMETERS
Received Directive Quality (RDQ)	This measure scores the quality of the directive by whether or not it was understood, and also the action taken by the recipient if the directive was not understood	Not understood, not queried Not understood, queried Understood Incomplete, not queried Incomplete, queried
Surprises Queried (SQ)	This measure scores the action taken by the cell when surprised	Not understood, not queried Queried via status board Queried via talk
Action taken to Influence Orange (AIO)	This measure scores the attempts by BLUE cells to influence ORANGE action	No attempt Attempt
Contingency Coverage (CC)	This measure scores the contingency planning of each cell	Number of contingencies
Orange Options Understood (OOU)	This measure scores the BLUE understanding of the options available to ORANGE	Not understood Understood Partially understood
Orange Intent Understood (OIU)	This measure scores BLUE understanding of ORANGE intentions, or plans	Not understood Understood Partially understood
Blue Predictions (PR)	This measure scores whether or not BLUE cells predicted the outcomes of each alternative action developed	Predictions made/ Not made/Number

This set of experiments had two technical objectives:

- verify expected performance variations among C^2 components, and
- estimate causal influences to test C^2 theory and examine consistency of results among experiments.

C^2 Echelons

Figure 4 displays the logic of the centrality experiments and illustrates the expected performance variation among C^2 components (i.e., performance at higher and lower echelons). These expectations come directly from the different emphasis of C^2 and combat systems. The basic argument is that greater emphasis should yield better results, and that C^2 activity at the higher (Fleet-level) echelon focuses on planning, while at the lower (battle group) echelon the emphasis is on battle management.

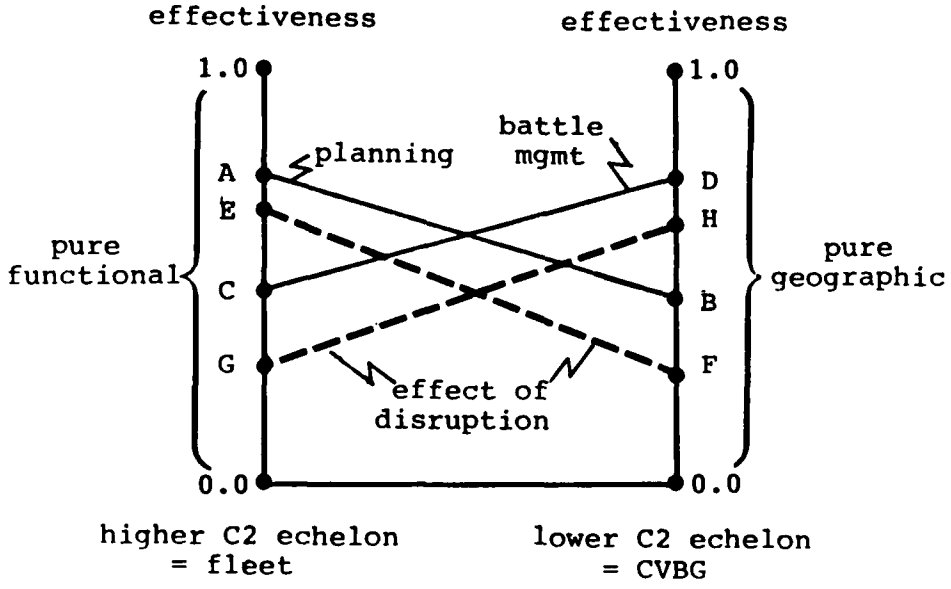
Centrality

As the axis labels of Figure 5 indicate, the same argument applies to three different but related circumstances:

- First, and most obviously, the interechelon difference in planning vs. battle management focus corresponds directly to the C^2 vs. combat system difference in control cycle emphasis.
- Second, variations in C^2 centrality mean that the same tasks are performed at different echelons. Thus, the pattern of performance as centrality is varied can be expected to be similar to the pattern of variation between echelons.
- Third, since functional-geographic C^2 corresponds to high-low C^2 centrality, the same pattern holds as the C^2 organization varies between functional and geographic.

C^2 System	combat system
• monitor	• surveillance
• explain	• detection
• options	• classification
• predict	• assessment
• decide	• engagement
• direct	• fire control

- variants of same process
- planner-shooter emphasis shift resembles C^2 centrality shift



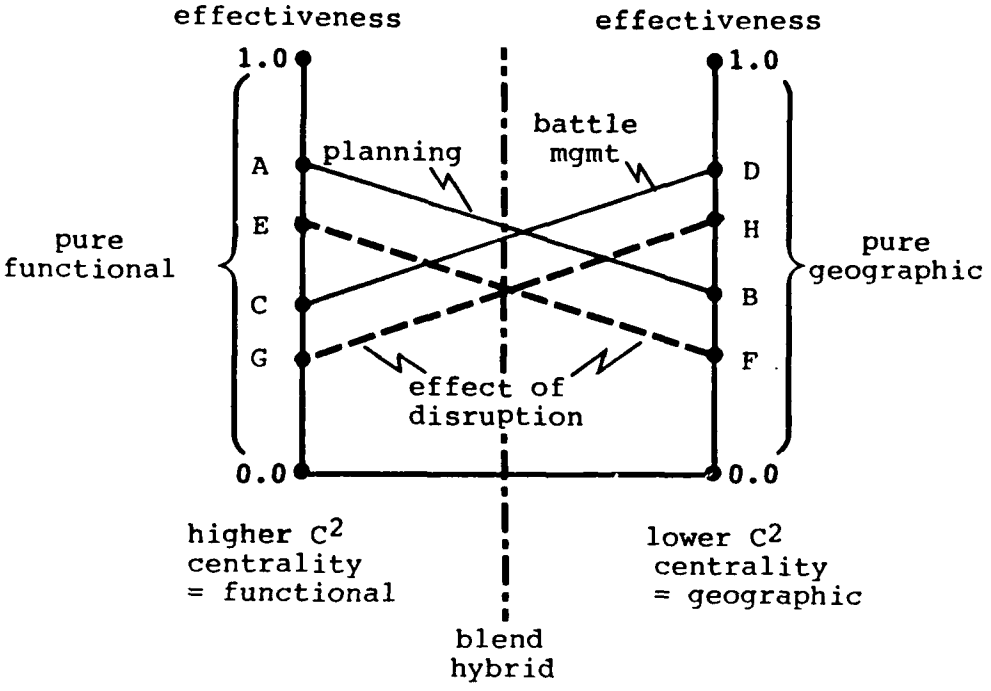
Between-echelon differences in C^2 process emphasis...

...generate effectiveness expectations of geographic and functional C^2

Figure 4. Logic of C2 Organizational Experiments

C^2 System	combat system
• monitor	• surveillance
• explain	• detection
• options	• classification
• predict	• assessment
• decide	• engagement
• direct	• fire control

- variants of same process
- planner-shooter emphasis shift resembles C^2 centrality shift



Centrality differences in C^2 process emphasis...

...generate effectiveness expectations of geographic, hybrid, and functional C^2

Figure 5. Logic of C2 Organizational Experiments

Thus, for the pattern of performance shown in Figures 4 and 5, the same set of axes can equally well represent differences of echelon, centrality, or functional-geographic organization. This last representation allows treatment of hybrid organizations vs. geographic or functional systems. In this case a simple "blend" hybrid lies somewhere between the geographic and functional axes. The hybrid "position" depends upon what proportions of C^2 tasks are performed functionally and what proportions are geographic. A different, and more dynamic, hybrid oscillates between axes, planning functionally and executing geographically. These experiments tested both a "blend" hybrid and a purely geographic structure.

Relation to Centrality Experiments

As shown in Figure 6, it is possible to relate the anticipated performance variations between the centrality levels of these experiments to the functional and geographic results derived from the previous experiments. Figure 6a indicates the axis location of the functional and geographic organizations in terms of the current experiments (from Figure 5). Figure 6b is derived by redefining the vertical axes to represent clear and disturbed communications environments, the axes used in the previous experiments. As shown in Figure 6c, combining the planning and battle management scores for higher and lower centrality displays the expected results for the current experiments in terms of the previous experiments.

ANALYSIS

The analysis uses HEAT scores to determine C^2 performance combined with indicants of tactical performance provided by the simulation. Scores are calculated separately for the planning

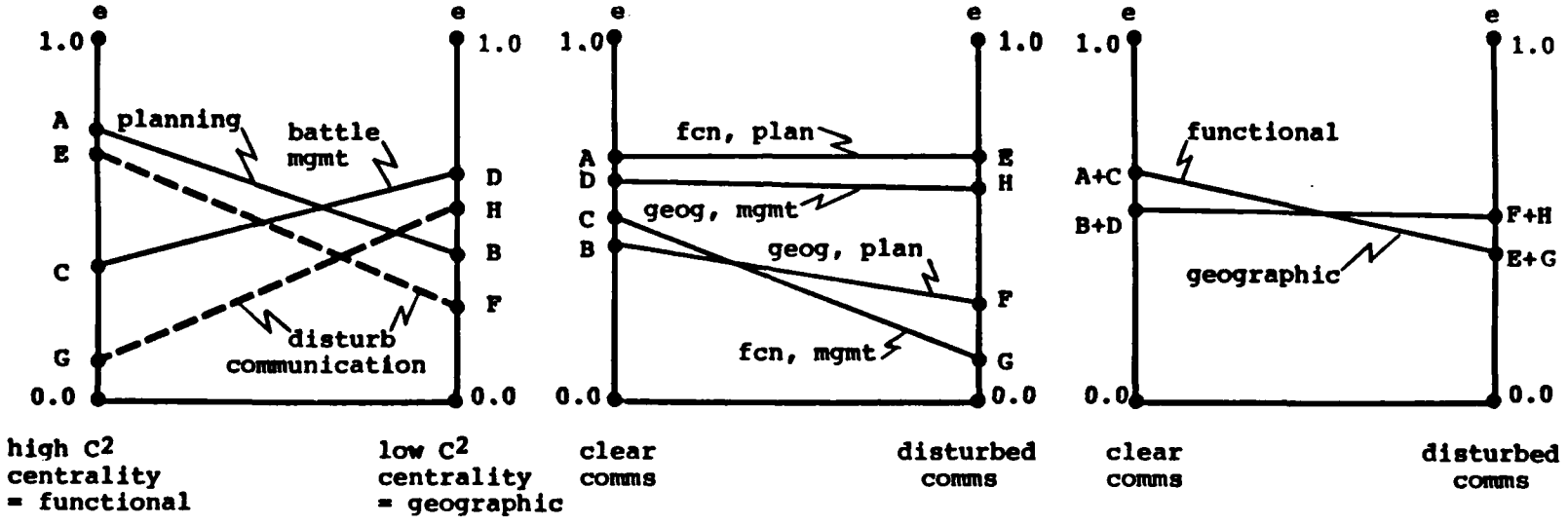


Figure 6. Relating Organizational and Centrality Experiments

phase and for the battle management phase of each session. The HEAT performance measures were aggregated into the following measures of C^2 effectiveness:

- The average HEAT score, $\bar{H}$
- The number of measures being worked on, n (i.e., how active the node was)
- The result of the number of measures being worked on multiplied by the average score, $n\bar{H}$, which yields a measure of the capacity of the system.

For echelon results, the $n\bar{H}$ scores for the CVBG nodes are averaged into a combined CVBG score, representing the lower C^2 echelon of Figure 4, and the scores for the Fleet node represent the high C^2 echelon of Figure 4. For the structural results, $n\bar{H}$ scores are calculated at the force level for hybrid and geographic organizations (Figure 5). Scores are determined for both clear and disturbed communications. Appendix C provides the HEAT tables and scores.

FINDINGS

The experiment design was based on the assumption that the two groups would be of like population and would react similarly to identical (or nearly identical) stimuli. As determined from the causal influences (included in Appendix D), each group behaved in a distinctly different manner. Group A was reactive, that is they tended to react to ORANGE actions as they occurred, while Group B was proactive, that is they attempted to anticipate, predict, and avoid or allow for ORANGE actions. Generally, proactive behavior is far more complex than reactive.

Group A actions were influenced by the ratio of BLUE to ORANGE losses (exchange ratio) from the previous trial, while Group B actions were influenced by the scenario from the previous trials. Group A tended to decrease BLUE losses by increasing their firing, even when the probability of hit equalled zero; this is an indication that they were reacting to ORANGE moves. Group B tended to reduce BLUE losses by paying more attention to increasing message traffic; this is an indication that they were dependent upon information from subordinates to effectively combat ORANGE. In the area of C^2 performance, for Group A the information search drove the C^2 effort, while for Group B the C^2 effort drove the information search. The comparison of interplay between radius of plot and C^2 quality indicates that Group A tended to be better at concentrating their efforts on the close-in-battle, while Group B excelled when viewing the "big picture." Overall, Group A performed well when they were reacting to the situation and Group B performed well when they answered communications between themselves and made an attempt to understand the situation. As a result of these differences, overall performance scores tend to reflect an averaging of two different populations rather than a representation of a homogeneous population. Therefore, the analysis includes separate group performance scores along with the overall performance scores for comparison.

Table II lists the summary overall and group $n\bar{H}$ scores for echelon and organizational performance.

C^2 Echelons

Figure 7a provides the anticipated results by echelon with Figure 7b displaying the overall achieved echelon results and Figures 7c and 7d showing the results by group. It is evident that the overall scores do not match the anticipated results, and show very little difference in scores. This is partially

TABLE II. $n\bar{H}$ Scores

OVERALL - ECHELON

FLEET NODE	CVBG
A = .39	B = .42
E = .35	F = .39
C = .43	D = .38
G = .30	H = .36

OVERALL - ORGANIZATION

HYBRID	GEOGRAPHIC
A = .37	B = .35
E = .31	F = .37
C = .32	D = .44
G = .30	H = .30

ECHELON - BY GROUP

FLEET NODE		CVBG NODE	
GROUP A (Reactive)	GROUP B (Proactive)	GROUP A (Reactive)	GROUP B (Proactive)
A = .26	A = .42	B = .41	B = .46
E = .26	E = .63	F = .39	F = .38
C = .37	C = .48	D = .34	D = .44
G = .31	G = .29	H = .39	H = .32

ORGANIZATION - BY GROUP

HYBRID		GEOGRAPHIC	
GROUP A	GROUP B	GROUP A	GROUP B
A = .38	A = .37	B = .30	B = .38
E = .31	E = *	F = .30	F = .40
C = .27	C = .40	D = .42	D = .45
G = .30	G = .28	H = .36	H = .27

LEGEND:

A,B = Planning phase, clear communications
E,F = Planning phase, disturbed communications
C,D = Battle management phase, clear communications
G,H = Battle management phase, disturbed communications

* = No data available

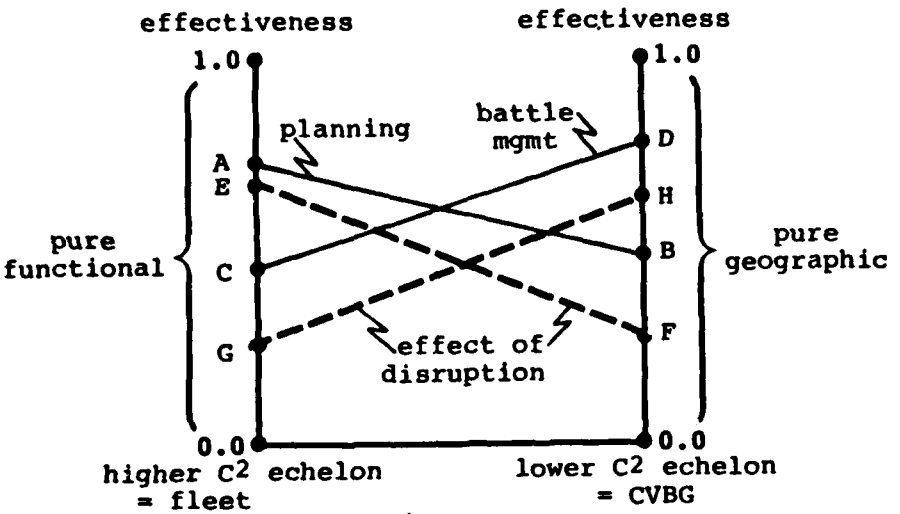


Figure a
Anticipated Results

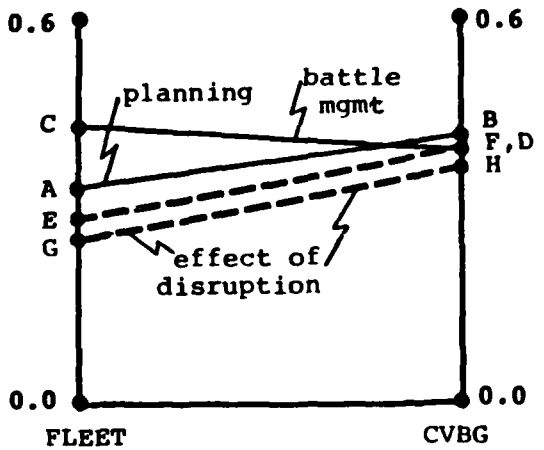


Figure b
Overall

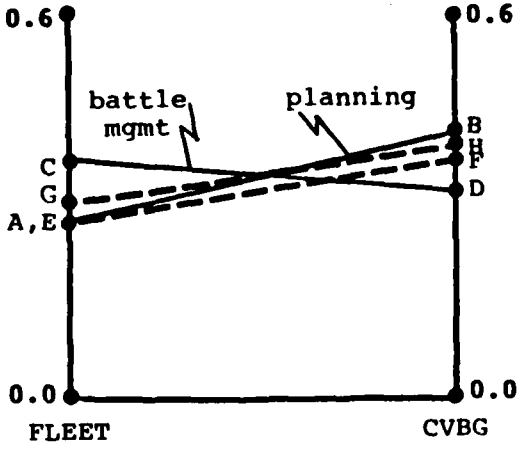


Figure c
Group A

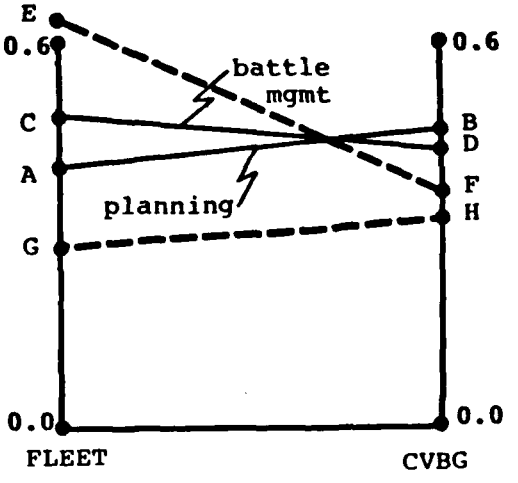


Figure d
Group B

Figure 7. Echelon Performance

the result of the different performances of each group tending to cancel out each other. The group performance charts likewise do not match expectations. Group A is apparently better at the CVBG level while Group B tends to be more uniform except for planning phase performance during disturbed communications. Overall, Group B tends to outperform Group A but is more affected by communications disturbance.

Centrality

Figure 8a provides the anticipated results for organizational comparison with Figure 8b displaying the overall achieved results and figures 8c and 8d showing the results by group.

The overall results tend to match the anticipated pattern with the hybrid axis residing slightly towards the functional side of Figure 8a. However, once again the overall results appear biased by the different group performance. Figure 8c shows that, for Group A, the hybrid axis is nearly identical with the functional axis, whereas for Group B the hybrid axis would appear closer to the geographic axis of Figure 8a. Once again Group B displays generally superior performance in a clear communications environment and suffering more from disturbed communications.

Relation to Centrality Experiments

Figures 9 and 10 display the results for echelon and organization in the terms of the centrality experiments, for overall and group performance. While overall echelon performance (Figure 9b) tends to match that of functional and geographic, the group performances are opposite each other (Figures 9c & 9d).

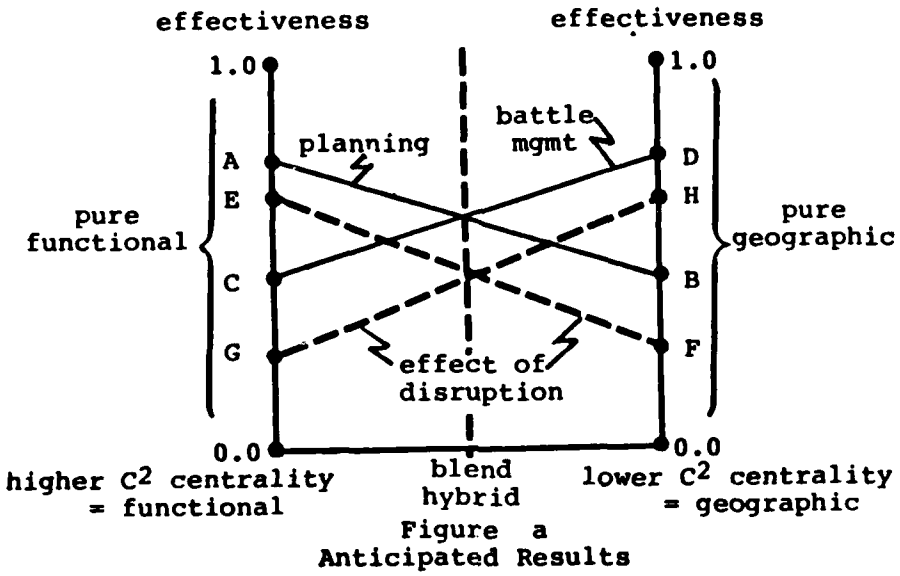


Figure a
Anticipated Results

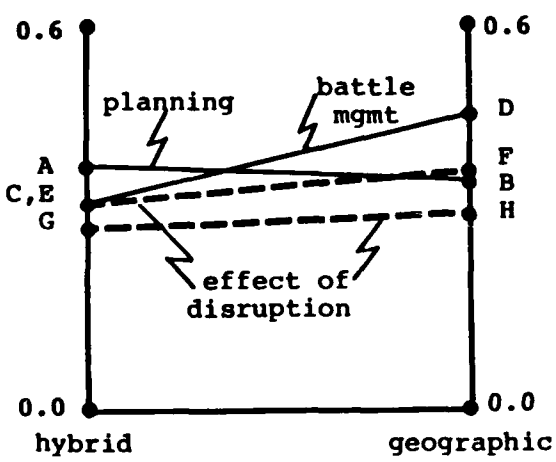


Figure b
Overall

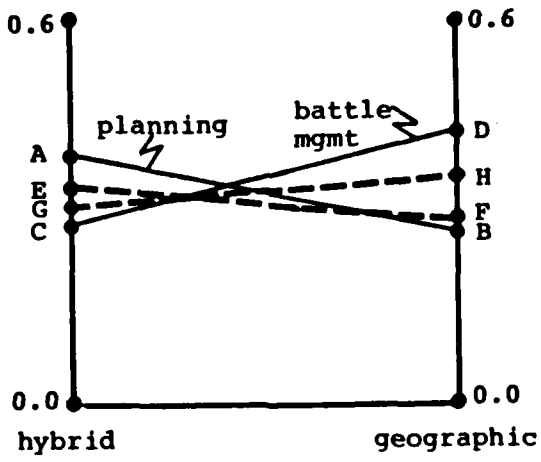


Figure c
Group A

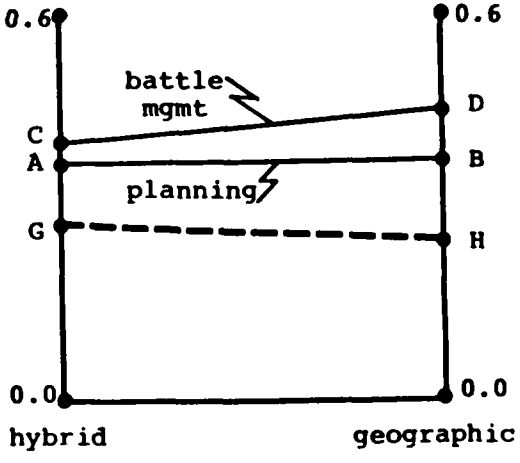


Figure d
Group B

Figure 8. Organizational Performance

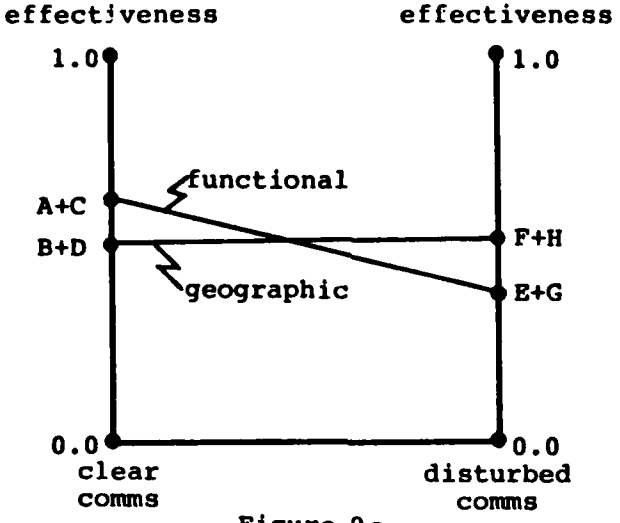


Figure 9a
Anticipated Results

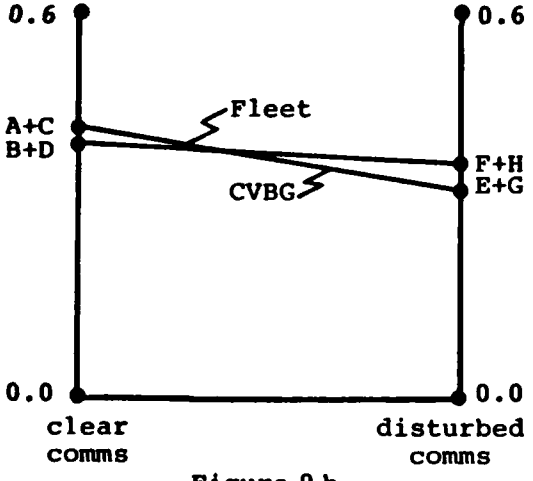


Figure 9 b
Overall

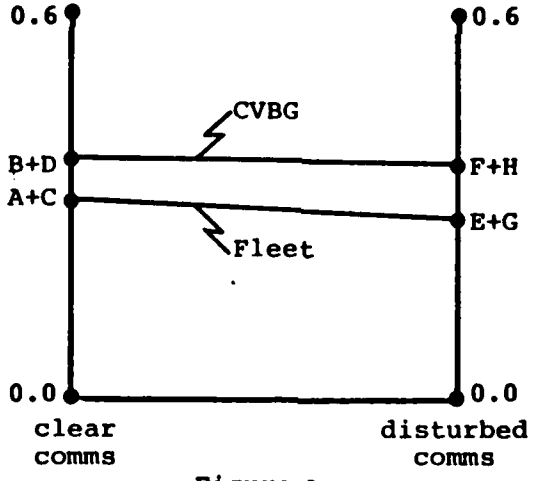


Figure 9 c
Group A

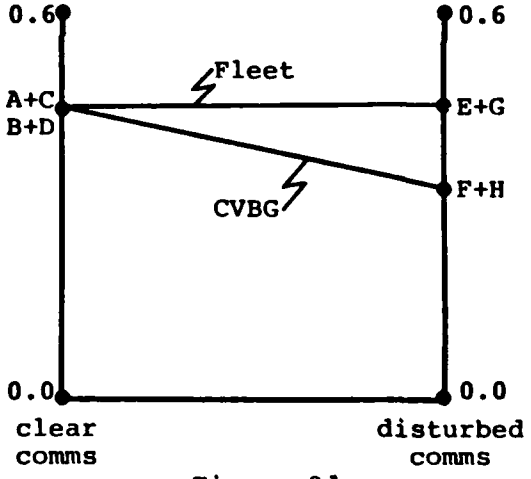


Figure 9d
Group B

Figure 9. Echelon Performance

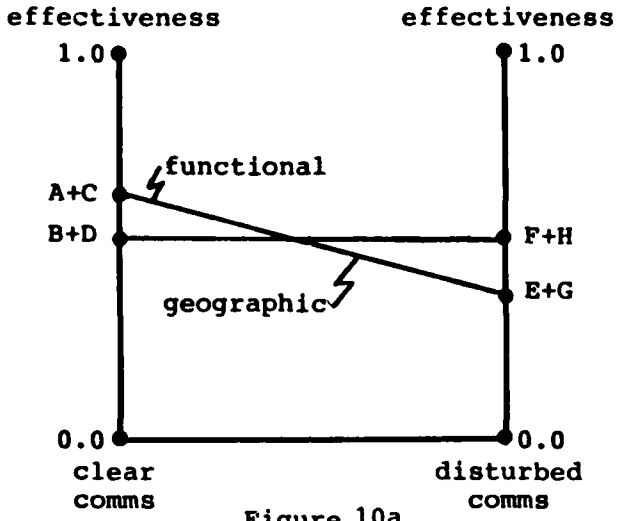


Figure 10a
Anticipated Results

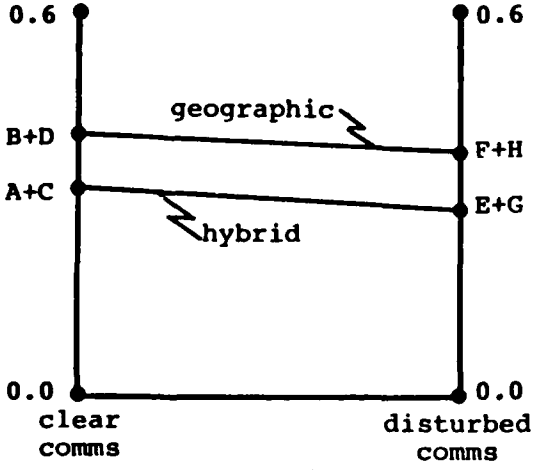


Figure 10b
Overall

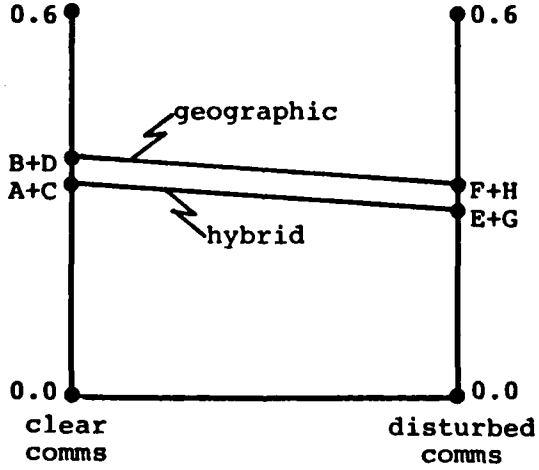


Figure 10c
Group A

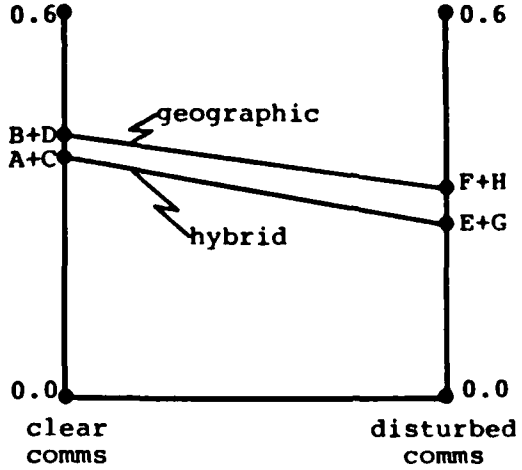


Figure 10d
Group B

Figure 10. Hybrid/Geographic Performance

Figure 10 indicates a slight advantage for geographic organization as opposed to hybrid; however, the scores are too close for it to be considered significant. It also depicts slightly better performance for Group B over Group A, with Group B experiencing greater difficulty with communications disturbance.

Summary

In summary, the $n\bar{H}$ scores indicate the following:

- Group B (Proactive) performed better in the Fleet role than in the CVBG role.
- Group A (Reactive) performed better in the CVBG role than in the Fleet role.
- Group B generally performed better than Group A in a benign communications environment.
- Group B was more affected by communications disturbance than Group A.
- Group A was affected by the type of organizational structure while Group B was not.

The last item is perhaps the most interesting. The effect of going from hybrid to geographic organization had a positive effect on Group A's battle management function but a negative effect on its planning function, which is basically consistent with the functional/geographic results. However, the lack of effect of organizational change in Group B's performance is inconsistent with expectations. This inconsistency is borne out by both regression analysis and the $n\bar{H}$ scores.

The inconsistency with expectations for the proactive group's performance can possibly be explained by its evidenced behavioral characteristics. Even in the geographic structure, the proactive group tended to manage from the center when given

the opportunity. Therefore, the expected difference between hybrid and geographic structures did not materialize because both structures were functionally nearly identical.

CONCLUSIONS

This set of experiments was designed and conducted to determine the effect of command echelon and centrality in the performance of planning and battle management tasks in benign and disturbed communications environments. While the findings apparently indicate that the lower echelons will be better at planning and that the degree of centrality can be used to effect a change in performance, the results are mainly inconclusive. This inconclusiveness arises mainly from the unexpected extremes of behavior displayed by the two groups, a difference for which the experiment was not designed to account.

However, the difference in behavioral characteristics between the two experimental groups confirms an earlier insight into the interaction of role and structure. The basic underlying HEAT theory states that, within a given headquarters organization, there are three main determinants of effectiveness: function, structure, and capacity. The theory holds that of the three, the largest impact on effectiveness would come from a change in function (role) followed by structure and capacity. This leverage on effectiveness is inversely proportional to the ease of accomplishing the change (i.e., function or role is the most difficult to change). Clearly, for this experiment, role did, in fact, exert the greatest leverage in effectiveness.

RECOMMENDED FUTURE EXPERIMENTS

It was postulated earlier that the underlying reason behind the lack of effect of organizational (structure) change on the proactive group's performance was that, no matter what the formal organization, the proactive group tended towards more centralization (e.g., hybrid). In other words, a change in role (function) negated the effect of a change in structure. If this is true, it may also be true that a cleverly designed change in structure could be used to achieve the same effect as a change in function. If it can be demonstrated over time that a favorable change in the behavior of an entity can be accomplished by altering its structure, useful results are possible. Because structure is theoretically easier to change than function, guidelines that enable a headquarters' structure to be changed, in such a manner so as to produce an impact on effectiveness equivalent to a change in role, could have significant impact on C^2 design. Therefore, a fruitful area of exploration would appear to be C^2 experiments designed to investigate the interplay between function and structure. These experiments should logically be a continuation and expansion of the current series.

Data from these experiments have also yielded the beginning definition of a mathematical relationship between the variables:

$X_{t+1} = AX_t + BY$ where

X = the system variables:
- HEAT scores
- Exchange ratio
- Size of raid
- Radius of plot
- Scenario
- Traffic
- Delay

Y = the external variables
- Seniority
- Communications disturbance
- Organization
- SIGINT

One possible goal of future experimentation is to refine our knowledge of the transformations A and B, of which the regression coefficients in the present analysis (Appendix D) represent preliminary estimates.

APPENDIX A. Experimental Scenarios

APPENDIX A. Experimental Scenarios

Like its predecessors, this set of experiments uses a family of related scenarios. Several scenarios are used to allow any given experimental team to participate in several experimental trials.

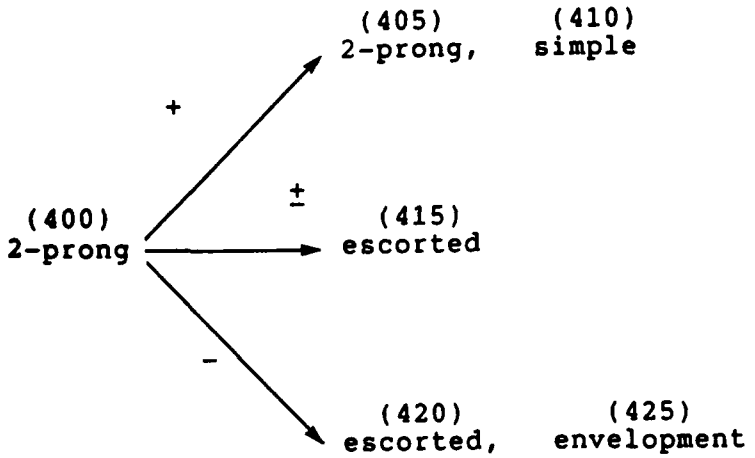
In such cases, the experimental design challenge is to achieve scenario similarity to allow comparison of results and to also achieve scenario diversity to avoid contaminated data. For these experiments, a family of four related scenarios was used:

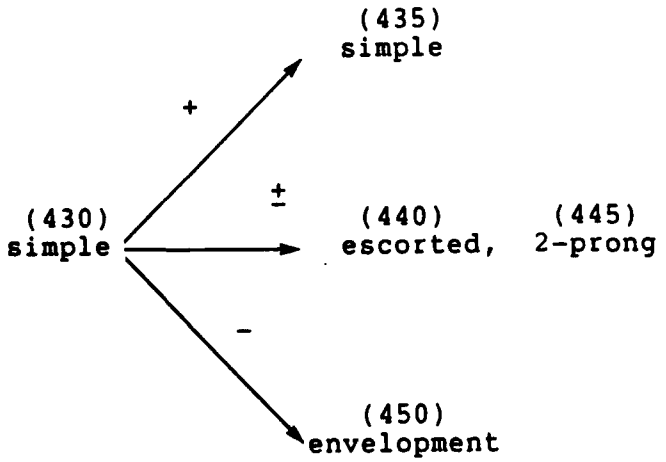
- simple counterforce
- 2-prong counterforce
- escorted counterforce with decoy
- attempted envelopment

These scenarios are limited by a briefing fiction that supposes ORANGE to be rational, aggresive, but not suicidal. Thus ORANGE's intent depends upon ORANGE's perception of prior effort. In the scenario dynamics sketched below:

- + means success, $\pm$ means mixed results and - means failure for ORANGE

- the 3-digit number refers to the DTG used for SITREP handouts, which allows unobtrusive briefing of handouts. The "500" series are test cases.


(405)
2-prong,
(410)
simple
+
±
(400)
2-prong
(415)
escorted
-
(420)
escorted,
(425)
envelopment


(435)
simple
+
±
(430)
simple
(440)
escorted,
(445)
2-prong
-
(450)
envelopment

DTG 060500Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 050001Z-060001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 5 days:

   (a) Considerable activity is reported at Murmansk with two SAGs sortied and a third getting underway.

   (b) An "extensive movement" of air assets from central front to NW has been reported.

   (c) ORANGE has denounced BLUE for "provocative escalation".

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

ORANGE Script for "Day 1" Test Scenario

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	00
air escort 1	72°00'N	24°30'E	270	00
air group 2	65°00'N	30°00'E	270	00
air decoy 1	72°00'N	24°00'E	270	00
air decoy 2	65°00'N	30°00'E	270	00
SAG	72°00'N	20°00'E	225	10
tattle A	67°30'N	12°00'E	180	10
tattle B	66°00'N	11°00'E	180	10
tattle C	64°30'N	10°00'E	180	10
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	10

ORANGE actions are as follows:

1. At t = 5, air decoy 1 comes to course 225° at speed 500 and air decoy 2 maintains course 270° with new speed of 500.

2. At t = 15, air decoy 1 comes to course 000°, and air decoy 2 comes to course 090°.

3. At t = 20, SAG increases speed to 30 knots, and tattles A, B, C come to course 315° at 30 knots.

4. At t = 25, sub B surfaces for 5 minutes then descends, air group 1 and air escort 1 both come to course 225° at speed 500, and air group C comes to speed 600.

5. At t = 45, all ORANGE air and surface units commence attack. ORANGE subs attack if capital targets available.

DTG 090505Z MAY 86
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SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE sources have proclaimed a "moral victory" resulting from recent efforts to dislodge BLUE forces.

   (b) Two SAGs are reportedly replenishing at Murmansk.

   (c) An intercepted message from the central front demands the return of borrowed air assets.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

ORANGE Script for "Day 4" Test Scenario

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	00
air decoy 1	72°00'N	24°00'E	270	00
air decoy 2	65°00'N	30°00'E	270	00
SAG	72°00'N	20°00'E	225	30
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	10

ORANGE actions are as follows:

1. At t = 5, air decoy 1 comes to course 225° and speed 500

2. At t = 10, air decoy 2 comes to course 270° and speed 500.

3. At t = 20, air decoy 1 comes to course 045°, and air group 1 comes to course 225 and speed 550.

4. At t = 30, sub C surfaces for 5 minutes.

5. ORANGE air and subs fire when within range.

DTG 060400Z MAY 86
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SUBJECT: Assessment of NW European Theater
This SITREP covers 050001Z-060001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 5 days:

   (a) Numerous attack aircraft are reported shifted from central front to NW front.

   (b) One SAG has sortied Murmansk.

   (c) An unconfirmed but believed reliable report says that a NW front request for coordinated air support has been denied by central front command.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090405Z MAY 86
FROM: CINCLANTFLT
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SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) Intercepted traffic describes combined air-sea assaults as "highly successful".

   (b) One SAG is at sea, reportedly outbound from Murmansk.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090410Z MAY 86
FROM: CINCLANTFLT
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SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) Intercepted ORANGE reports describe senior commanders as "highly satisfied" with results of combined air-sea assaults.

   (b) Unverified reports indicate that a "low-cost pin-down" strategy is being debated.

   (c) Two SAGs are reported to have sortied Murmansk.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090415Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE forces have achieved only mixed success from combined air-sea assaults. They have kept BLUE forces busy, but have inflicted very little damage.

   (b) The SAG has returned to port after apparently suffering heavy storm damage.

   (c) There are unconfirmed reports of fighter-interceptor aircraft being relocated from central to NW front airfields.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090420Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE forces have achieved very little success with combined air-sea attacks. Although ORANGE losses are light, BLUE losses are practically none.

   (b) An extensive movement of air assets to and toward the NW front is reported underway.

   (c) One SAG has sortied Murmansk.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090425Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-080001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE has achieved very little success with its combined air-sea assault.

   (b) The SAG is reported replenishing at Murmansk.

   (c) Large numbers of fighter-interceptors are reported moving from central to NW front.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 060430Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 050001Z-060001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 5 days:

   (a) Numerous attack aircraft are reported moving from the central front to NW front.

   (b) An unconfirmed report holds that SAGs are restricted to base, due to presence of BLUE forces.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090435Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE commanders have reported "moderate success" with air strikes from north.

   (b) Although ORANGE claims no BLUE sinkings, senior commanders are reportedly "very satisfied" that BLUE forces have not moved aggresively and that ORANGE air losses are very light.

   (c) Additional strike aircraft are reported moving from the central to NW front.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090440Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE commanders are reported to view air strikes from north as achieving "mixed success".

   (b) ORANGE losses have been light, but ORANGE has inflicted little damage due to premature launch of missiles.

   (c) Intercepted traffic reveals that all SAGs are restricted to port for unknown reasons.

   (d) NW request for attack aircraft from central front have reportedly been denied.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090445Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE air strikes from north have achieved only moderate success. ORANGE losses have been light, but BLUE remains a serious threat.

   (b) Some air assets are reportedly being shifted from NW to central front to meet urgent requirements.

   (c) One SAG has sortied Murmansk.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

DTG 090450Z MAY 86
FROM: CINCLANTFLT
TO: COMSECONDFLT, CTG 22.1, CTG 22.2, CTG 22.3
SUBJECT: Assessment of NW European Theater
This SITREP covers 080001Z-090001Z MAY 86

Politico-Military Events in NW European Theater

1. U.S. intelligence has made the following assessment of events in the theater during the past 3 days:

   (a) ORANGE has achieved very limited success using air raids from the north.

   (b) Air assets are reported either moving to NW, or are being made available to support NW initiatives.

   (c) Two SAGs are reported to have sortied Murmansk.

BLUE Mission and Planning Requirements

1. BLUE mission elements, in descending priority, are as follows:

   (a) Maintain sea control and a usable force
   (b) Project power ashore
   (c) Active ASW effort
   (d) Active ASUW effort

2. A BLUE Force summary plan of action is due 30 minutes after receipt of this SITREP. Required plan elements are:

   (a) ORANGE options, intent, and other contingencies
   (b) BLUE options to cover contingencies
   (c) Assessment of BLUE options
   (d) BLUE plan
   (e) Implementing directive(s)

ORANGE Script for Scenario S: Simple Counterforce

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	00
*tattle A	67°30'N	12°00'E	180	10
*tattle B	66°00'N	11°00'E	180	10
*tattle C	64°30'N	10°00'E	180	10
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	10

ORANGE actions are as follows:

*1. At t = 05, tattles A, B, and C comes to course 315° and speed 30.

2. At t = 10, air group 1 increases speed to 550.

3. At t = 15, sub C surfaces for 5 minutes.

4. At = 20, air group 1 comes to course 220. Air group 1 commences firing when within range of CVBG A.

*Tattles A, B, and C occur only in "day 1" uses of scenario S. For "day 4" uses of scenario S, the tattletales are presumed fled or sunk.

ORANGE Script for Scenario S_e: Escorted Counterforce

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	500
air escort 1	72°00'N	24°30'E	270	500
air decoy 1	72°00'N	24°00'E	225	00
air decoy 2	65°00'N	30°00'E	270	00
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	10

ORANGE actions are as follows:

1. At t = 05, air decoy 1 comes to course 225° with speed 550.

2. At t = 10, air decoy 2 comes to course 270° with speed 550.

3. At t = 20, air decoy 1 comes to course 045°, and air group 1 comes to course 190°.

4. At t = 25, air decoy 2 comes to course 090°.

5. Air group 1 attacks when within launch range of CVBG A.

ORANGE Script for Scenario 2: 2-Prong Counterforce

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	500
air decoy 2	65°00'N	30°00'E	270	00
SAG	72°00'N	20°00'E	225	10
*tattle A	67°30'N	12°00'E	180	10
*tattle B	66°00'N	11°00'E	180	10
*tattle C	64°30'N	10°00'E	180	10
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	00

ORANGE actions are as follows:

*1. At t = 05, tattles A, B, and C come to course 225° and speed 30.

2. At t = 10, air decoy 2 comes to course 270 and speed 550, and SAG increases speed to 30.

3. At t = 20, sub C surfaces for 5 minutes.

4. At t = 25, air decoy 2 comes to course 090, and air group 1 comes to course 250°.

5. At t = 30, air group 1 comes to course 180°. Both SAG and air group 1 open fire when possible.

*Tattles A, B, and C occur only in "day 1" uses of scenario 2. For "day 4" uses of scenario 2, the tattletales are presumed fled or sunk.

ORANGE Script for Scenario E: Attempt Envelopment

At the beginning of game play, the position of forces is as follows:

CVBG A	67°30'N	13°30'E	course 180	speed 10
CVBG B	66°20'N	11°30'E	180	10
CVBG C	64°00'N	9°30'E	180	10
air group 1	72°00'N	25°00'E	270	500
air escort 1	72°00'N	24°30'E	270	500
air group 2	65°00'N	30°00'E	180	500
SAG	72°00'N	20°00'E	270	10
sub A	67°30'N	14°00'E	180	00
sub B	67°00'N	12°00'E	180	10
sub C	65°30'N	11°00'E	180	10

ORANGE actions are as follows:

1. At t = 5, SAG comes to course 225° and speed 30.

2. At t = 10, air group 2 comes to course 270°.

3. At t = 15, sub B surfaces for 5 minutes.

4. At t = 20, sub C surfaces for 5 minutes, and air group 1 comes to course 210°.

5. At t = 40 or whenever in range, all ORANGE units open fire.

APPENDIX B. Experimental Database and Data Dictionary

APPENDIX B. Experimental Database and Data Dictionary

This set of experiments has generated much information, summarized here in a compact database with 110 variables and 64 observations. The program used on the IBM PC computer to evaluate this experiment is listed on pages B-2 to B-4. This SPSS/PC+ file indicates where each variable is located in the data base, what each variable represents, values for descriptive variables, values representing missing data, and equations used to transform the original values into normalized values for regression calculations. A variable name summary is included on pages B-5 to B-8 indicating the variable representations used in the computer program as well as in other sections of this report. The data base is divided into two sections--original values on pages B-9 to B-15 and normalized values on pages B-16 to B-27.

```
data list file='exp85.dat'
/group 1 sess 2 day 3 half 4 organ 5 senor 6-7 (1) sigint 8
scen 9-11 (2) comms 12 msgou1 to msgou5 13-22 timou1 to timou5
23-42 msgin1 to msgin5 43-52 totmsg 53-55 mainmsg 56-58/ timin1 to timin5 1-20
rad1 to rad3 21-32 s1 to s3 33-44 srch1 to srch3 45-50 com1 to com3 51-59
comorg 60-62 / ph1 to ph3 1-6 phorg 7-8 h1 to h5 9-23 (2) n1 to n5
24-28 q 29-30 tt 31-32 et 33-34 lat 35-36 epu1 to epu3 37-45
epun 46-47 epuorg 48-49 bgepu 50-52 er 53-56 (2) scent 57-59 (2).

variable labels sess 'session'/ organ 'organization'/ senor 'senority'/
sigint 'signal intelligence'/ scen 'scenario'/ comms 'communication status'/
msgou1 'msgs from Coral Sea'/ msgou2 'msgs from JFK'/msgou3
'msgs from Saratoga'/ msgou4 'msgs from strike'/ msgou5
'msgs from Second Fleet'/ timou1 'Coral Sea msg production time'/ timou2
'JFK msg production time'/timou3 'Saratoga msg production time'/ timou4
'strike msg production time'/ timou5 'Second Fleet msg production time'/
msgin1 'msgs to Coral Sea'/ msgin2 'msgs to JFK'/ msgin3 'msgs to Saratoga'/
msgin4 'msgs to strike'/ msgin5 'msgs to Second Fleet'/timin1
'Coral Sea msg read time'/timin2 'JFK msg read time'/timin3
'Saratoga msg read time'/timin4 'strike msg read time'/timin5
'Second Fleet msg read time'/rad1 'Coral Sea radius of view'/ rad2
'JFK radius of view'/ rad3 'Saratoga radius of view'/ s1
'Coral Sea radius spread'/ s2 'JFK radius spread'/ s3 'Saratoga radius spread'
/srch1 'Coral Sea search activity'/ srch2 'JFK search activity'/ srch3
'Saratoga search activity'/ com1 'Coral Sea commands'/ com2 'JFK commands'/
com3 'Saratoga commands'/ comorg 'Orange commands'/ph1 'Coral Sea PH=0%'/
ph2 'JFK PH=0%'/ ph3 'Saratoga PH=0%'/phorg 'Orange PH=0%'/h1
'Coral Sea avg HEAT score'/h2 'JFK avg HEAT score'/h3 'Saratoga avg HEAT score'
/h4 'strike avg HEAT score'/h5 'Second Fleet avg HEAT score'/n1
'Coral Sea measure effort'/n2 'JFK measure effort'/n3 'Saratoga measure effort'
/n4 'strike measure effort'/n5 'Second Fleet measure effort'/q 'size of strike'
/tt 'total session time'/et 'ellapsed time until strike'/lat 'time strike late'
/epu1 'EPUs lost by Coral Sea'/epu2 'EPUs lost by JFK'/epu3
'EPUs lost by Saratoga'/epun 'EPUs lost by neutral forces'/epuorg
'EPUs lost by Orange'/bgepu 'EPUs lost by all blue forces'/er 'exchange ratio'
/totmsg 'total msg count'/mainmsg 'main stem msg count'/scent 'scenario lag'.

value labels group 0 'A' 1 'B'/ sess 0 '1' 1 '2' 2 '3' 3 '4' 4 '5' 5 '6' 6 '7'
7 '8' 8 '9'/ day 0 'day 1' 1 'day 4'/ half 0 'first half' 1 'second half'/
organ 0 'geographic' 1 'hybrid'/scen scent 1 'simple counterforce' 0.67
'2-prong counterforce' 0.33 'escorted counterforce' 0 'attempt envelopment'/
comms 1 'clear' 0 'disturb'.

missing value rad1 to rad3 s1 to s3 (9999)/com1 to com3 comorg epu1 to epu3
bgepu (999)/srch1 to srch3 ph1 to ph3 phorg epun epuorg (99)/er (99.99)/
scent h1 to h5 (9.99)/n1 to n5 (9).

compute sess=sess/8.
compute msgou1=1-(msgou1/56).
compute msgou2=1-(msgou2/56).
compute msgou3=1-(msgou3/56).
compute msgou4=1-(msgou4/56).
compute msgou5=1-(msgou5/56).
compute timou1=1-(timou1/1617).
compute timou2=1-(timou2/1617).
compute timou3=1-(timou3/1617).
compute timou4=1-(timou4/1617).
compute timou5=1-(timou5/1617).
```

```
compute wkld1=msqou1*timou1.
compute wkld2=msqou2*timou2.
compute wkld3=msqou3*timou3.
compute wkld4=msqou4*timou4.
compute wkld5=msqou5*timou5.
compute bqwkld=(wkld1+wkld2+wkld3)/3.
compute syswkld=(wkld1+wkld2+wkld3+wkld4+wkld5)/5.
compute msqin1=1-(msqin1/51).
compute msqin2=1-(msqin2/51).
compute msqin3=1-(msqin3/51).
compute msqin4=1-(msqin4/51).
compute msqin5=1-(msqin5/51).
compute bqmsqin=(msqin1+msqin2+msqin3)/3.
compute sysmsqin=(msqin1+msqin2+msqin3+msqin4+msqin5)/5.
compute timin1=1-(timin1/1730).
compute timin2=1-(timin2/1730).
compute timin3=1-(timin3/1730).
compute timin4=1-(timin4/1730).
compute timin5=1-(timin5/1730).
compute bqtimin=(timin1+timin2+timin3)/3.
compute systimin=(timin1+timin2+timin3+timin4+timin5)/5.
compute rad1=rad1/1417.
compute rad2=rad2/1417.
compute rad3=rad3/1417.
compute bqrad=(rad1+rad2+rad3)/3.
compute s1=s1/3091.
compute s2=s2/3091.
compute s3=s3/3091.
compute bqs=(s1+s2+s3)/3.
compute srch1=srch1/23.
compute srch2=srch2/23.
compute srch3=srch3/23.
compute bqsrch=(srch1+srch2+srch3)/3.
compute bqcom=(com1+com2+com3)/357.
compute com1=com1/194.
compute com2=com2/194.
compute com3=com3/194.
compute comorg=comorg/194.
compute bqph=1-((ph1+ph2+ph3)/27).
compute ph1=1-(ph1/27).
compute ph2=1-(ph2/27).
compute ph3=1-(ph3/27).
compute phorg=1-(phorg/27).
compute n1=n1/7.
compute n2=n2/7.
compute n3=n3/7.
compute n4=n4/7.
compute n5=n5/7.
compute bqn=(n1+n2+n3)/3.
compute sysn=(n1+n2+n3+n4+n5)/5.
compute fsn=(n4+n5)/2.
compute bqh=(h1+h2+h3)/3.
compute sysh=(h1+h2+h3+h4+h5)/5.
compute fsh=(h4+h5)/2.
compute nh1=n1*h1.
compute nh2=n2*h2.
compute nh3=n3*h3.
compute nh4=n4*h4.
compute nh5=n5*h5.
```

```
compute bqnh=(nh1+nh2+nh3)/3.
compute sysnh=(nh1+nh2+nh3+nh4+nh5)/5.
compute fsnh=(nh4+nh5)/2.
compute q=q/60.
compute timdep=1-(et/tt).
compute late=1-(lat/tt).
compute epu1=1-(epu1/171).
compute epu2=1-(epu2/171).
compute epu3=1-(epu3/171).
compute epun=1-(epun/171).
compute epuorg=(epuorg/171).
compute bqepu=1-(bqepu/171).
compute eput1=lag(epu1).
if (eput1=1-(10/171)) eput1=9.99.
compute eput2=lag(epu2).
if (eput2=1-(3/171)) eput2=9.99.
compute eput3=lag(epu3).
if (eput3=1-(1/171)) eput3=9.99.
compute epunt=lag(epun).
if (epunt=1-(4/171)) epunt=9.99.
compute epuorgt=lag(epuorg).
if (epuorgt=(3/171)) epuorgt=9.99.
compute bqeput=lag(bqepu).
if (bqeput=1-(58/171)) bqeput=9.99.
compute er=1-(er/17.20).
compute ert=lag(er).
if (ert=1-(1.61/17.20)) ert=9.99.
compute totmsg=totmsg/191.
compute mainmsg=mainmsg/191.
compute othmsg=totmsg-mainmsg.

variable labels wild1 'Coral Sea msg production'/wild2 'JFK msg production'/
wild3 'Saratoga msg production'/wild4 'strike msg production'/wild5
 'Second Fleet msg production'/bawild 'CVBG avg msg production'/syswild
 'system avg msg production'/bqmsgin 'avg msgs to CVBG'/evsmsgin
'avg msgs to system'/botimin 'CVBG avg msg read time'/systimin
 'system avg msg read time'/barad 'avg CVBG radius of view'/bqs
 'CVBG avg radius spread'/bqsrch 'CVBG avg search activity'/bqcom
'avg CVBG commands'/bqph 'CVBG avg PH=0%'/nh1 'Coral Sea HEAT value'/nh2
'JFK HEAT value'/nh3 'Saratoga HEAT value'/nh4 'strike HEAT value'/nh5
'Second Fleet HEAT value'/timdep 'strike departure'/late 'strike late'/
othmsg 'other msg count'/bqm 'avg CVBG measure effort'/svsm
'avg system measure effort'/bqh 'avg CVBG HEAT score'/svsh
'avg system HEAT score'/bqnh 'avg CVBG HEAT value'/svsnh
'avg system HEAT value'/eput1 'lag of EPUs lost by Coral Sea /eput2
'lag of EPUs lost by JFK'/eput3 'lag of EPUs lost by Saratoga'/epunt
'lag of EPUs lost by Neutral forces'/epuorgt 'lag of EPUs lost by Orange'/
bqeput 'lag of EPUs lost by Blue'/ert 'lag exchange ratio'/fsm
'avg strike & Second Fleet measure effort'/fsh
'avg strike & Second Fleet HEAT value'/fsnh
'avg strike & Second Fleet HEAT score'.

missing value eput1 to eput3 epunt epuorgt bqeput ert (9.99).

formats all(f4.2).
```

VARIABLE NAME SUMMARY

As Used in Computer Program		As used in Appendix D	
Variable Name	Variable Label	Equations	Causal Matrix
BGCOM	Average CVBG commands issued	n_c	
BGEPU	EPUs lost by all BLUE forces	Q_B	BLUE losses
BGEPUT	Lag of EPUs lost by BLUE	EPU_{t-1}	
BGH	Average CVBG HEAT score		
BGMSGIN	Average Messages to CVBG		
BGN	Average CVBG C^2 level of effort		
BGNH	Average CVBG HEAT value		
BGPH	Average times CVBG PH = 0%	PH_o	Futile firing
BGRAD	Average CVBG radius of view	r_p	range
BGS	Average CVBG radius spread	s_p	variety
BGSRCH	Average CVBG search activity	n_p	vigilance
BGTIMIN	Average CVBG message read time		
BGWKLD	Average CVBG message production		
COM1	Coral Sea commands issued		
COM2	JFK commands issued		
COM3	Saratoga commands issued		
COMMS	Communication status	comm	clear comms
COMORG	ORANGE commands issued		
DAY			
EPU1	EPUs lost by Coral Sea	EPU_c	
EPU2	EPUs lost by JFK	EPU_j	
EPU3	EPUs lost by Saratoga	EPU_s	
EPUN	EPUs lost by neutral forces		
EPUNT	Lag of EPUs lost by nuetral forces		
EPUORG	EPUs lost by ORANGE	Q_o	ORANGE losses
EPUORGT	Lag of EPUs lost by ORANGE		
EPUT1	Lag of EPUs lost by Coral Sea		
EPUT2	Lag of EPUs lost by JFK		
EPUT3	Lag of EPUs lost by Saratoga	EPU_{t-1}	
ER	Exchange ratio	ER	exchange ratio
ERT	Lag of exchange ratio	ER_{t-1}	exchange $ratio_{t-1}$

VARIABLE NAME SUMMARY

(Continued)

As Used in Computer Program		As used in Appendix D	
Variable Name	Variable Label	Equations	Causal Matrix
ET	Ellapsed time until strike		
FSH	Avg. Strike & Second Fleet HEAT value		
FSN	Avg. Strike & Second Fleet C^2 effort		
FSNH	Avg. Strike & Second Fleet HEAT score		
GROUP			
H1	Coral Sea average HEAT score	$\bar{H}_c$	
H2	JFK average HEAT score	$\bar{H}_j$	
H3	Saratoga average HEAT score	$\bar{H}_s$	
H4	Strike average HEAT score	$\bar{H}_t$	
H5	Second Fleet average HEAT score	$\bar{H}_f$	
HALF		half	
LAT	Time strike is late		
LATE	Normalized strike late time	tl	timely launch
MAINMSG	Main stem message count	n_m	message traffic
MSGIN1	Messages to Coral Sea	cn_i	
MSGIN2	Messages to JFK	jn_i	
MSGIN3	Messages to Saratoga	sn_i	
MSGIN4	Messages to Strike	tn_i	
MSGIN5	Messages to Second Fleet	fn_i	
MSGOU1	Messages from Coral Sea	cn_o	
MSGOU2	Messages from JFK	jn_o	
MSGOU3	Messages from Saratoga	sn_o	
MSGOU4	Messages from Strike	tn_o	
MSGOU5	Messages from Second Fleet	fn_o	
N1	Coral Sea C^2 level of effort	cn_H	
N2	JFK C^2 level of effort	jn_H	
N3	Saratoga C^2 level of effort	sn_H	
N4	Strike C^2 level of effort	tn_H	
N5	Second Fleet C^2 level of effort	fn_H	

VARIABLE NAME SUMMARY

(Continued)

As Used in Computer Program		As used in Appendix D	
Variable Name	Variable Label	Equations	Causal Matrix
NH1	Coral Sea HEAT value	$n\bar{H}_c$	
NH2	JFK HEAT value	$n\bar{H}_i$	
NH3	Saratoga HEAT value	$n\bar{H}_s$	
NH4	Strike HEAT value	$n\bar{H}_t$	
NH5	Second Fleet HEAT value	$n\bar{H}_f$	
ORGAN	Organization	organ	hybrid C^2 org.
OTHMSG	Other message count	n_{ot}	message traffic
PH1	Times Coral Sea PH = 0%	PH_c	
PH2	Times JFK PH = 0%	PH_j	
PH3	Times Saratoga PH = 0%	PH_s	
PHORG	Times ORANGE PH = 0%		
Q	Size of strike	Q	strike size
RAD1	Coral Sea radius of view	cr_p	
RAD2	JFK radius of view	jr_p	
RAD3	Saratoga radius of view	sr_p	
S1	Coral Sea radius spread	cs_p	
S2	JFK radius spread	js_p	
S3	Saratoga radius spread	ss_p	
SCEN	Scenario	scen	scenario
SCENT	Scenario lag	$scen_{t-1}$	$scenario_{t-1}$
SENOR	Senority	senor	senority
SESS	Session	sess	
SIGINT	Siginal Intelligence	SIGINT	SIGINT
SRCH1	Coral Sea search activity	cn_p	
SRCH2	JFK search activity	jn_p	
SRCH3	Saratoga search activity	sn_p	
SYSH	Average system HEAT score	$\bar{H}$	quality
SYSMSGIN	Average messages to system	n_i	

VARIABLE NAME SUMMARY

(Continued)

As Used in Computer Program		As used in Appendix D	
Variable Name	Variable Label	Equations	Causal Matrix
SYSN	Average system C^2 effort	n_H	scope
SYSNH	Average system HEAT value	n_H	capacity
SYSTIMIN	Average system message read time	$\bar{t}_i$	message delay
SYSWKLD	Average system message production	wk	message traffic
TIMDEP	Strike departure time	t_Q	
TIMIN1	Coral Sea message read time	$c\bar{t}_i$	
TIMIN2	JFK message read time	$j\bar{t}_i$	
TIMIN3	Saratoga message read time	$s\bar{t}_i$	
TIMIN4	Strike message read time	$t\bar{t}_i$	
TIMIN5	Second Fleet message read time	$f\bar{t}_i$	
TIMOU1	Coral Sea message production time	$c\bar{t}_o$	
TIMOU2	JFK message production time	$j\bar{t}_o$	
TIMOU3	Saratoga message production time	$s\bar{t}_o$	
TIMOU4	Strike message production time	$t\bar{t}_o$	
TIMOU5	Second Fleet message production time	$f\bar{t}_o$	
TOTMSG	Total message count	n_t	message traffic
TT	Total session time		
WKLD1	Coral Sea message production	wk_c	
WKLD2	JFK message production	wk_j	
WKLD3	Saratoga message production	wk_s	
WKLD4	Strike message production	wk_t	
WKLD5	Second Fleet message production	wk_f	

Original Values

Sequencing and Parameter Variables

Case#	GROUP	SESS	DAY	HALF	ORGAN	SENOR	SIGINT	SCEN	SCENT	COMMS
1	0	0	0	0	0	0.0	0	.67	9.99	0
2	0	0	0	1	0	0.0	0	.67	9.99	0
3	0	0	1	0	0	0.0	0	0.0	.67	0
4	0	0	1	1	0	0.0	0	0.0	.67	0
5	0	1	0	0	1	0.0	0	1.00	0.0	0
6	0	1	0	1	1	0.0	0	1.00	0.0	1
7	0	1	1	0	1	0.0	0	0.0	1.00	1
8	0	1	1	1	1	0.0	0	0.0	1.00	0
9	0	2	0	0	0	0.0	0	.67	0.0	1
10	0	2	0	1	0	0.0	0	.67	0.0	0
11	0	2	1	0	0	0.0	0	.67	.67	1
12	0	2	1	1	0	0.0	0	.67	.67	1
13	0	3	0	0	1	0.0	0	1.00	.67	0
14	0	3	0	1	1	0.0	0	1.00	.67	0
15	0	3	1	0	1	0.0	0	.67	1.00	0
16	0	3	1	1	1	0.0	0	.67	1.00	0
17	0	4	0	0	1	0.0	0	.67	.67	0
18	0	4	0	1	1	0.0	0	.67	.67	0
19	0	4	1	0	1	0.0	0	.33	.67	0
20	0	4	1	1	1	0.0	0	.33	.67	0
21	0	5	0	0	1	0.0	0	.67	.33	0
22	0	5	0	1	1	0.0	0	.67	.33	1
23	0	5	1	0	1	0.0	0	.33	.67	0
24	0	5	1	1	1	0.0	0	.33	.67	1
25	0	6	0	0	1	0.0	0	.67	.33	0
26	0	6	0	1	1	0.0	0	.67	.33	1
27	0	6	1	0	1	0.0	0	1.00	.67	0
28	0	6	1	1	1	0.0	0	1.00	.67	0
29	0	7	0	0	0	.5	0	.67	1.00	0
30	0	7	0	1	0	.5	0	.67	1.00	1
31	0	8	0	0	1	1.0	0	.67	.67	0
32	0	8	0	1	1	1.0	0	.67	.67	0
33	1	0	0	0	1	0.0	0	1.00	9.99	1
34	1	0	0	1	1	0.0	0	1.00	9.99	0
35	1	0	1	0	1	0.0	0	.33	1.00	1
36	1	0	1	1	1	0.0	0	.33	1.00	0
37	1	1	0	0	0	0.0	0	1.00	.33	1
38	1	1	0	1	0	0.0	0	1.00	.33	0
39	1	1	1	0	0	0.0	0	.67	1.00	1
40	1	1	1	1	0	0.0	0	.67	1.00	0
41	1	2	0	0	0	0.0	0	.67	.67	0
42	1	2	0	1	0	0.0	0	.67	.67	0
43	1	2	1	0	0	0.0	0	.33	.67	0
44	1	2	1	1	0	0.0	0	.33	.67	0
45	1	3	0	0	1	0.0	1	1.00	.33	1
46	1	3	0	1	1	0.0	1	1.00	.33	1
47	1	3	1	0	1	0.0	1	1.00	1.00	1
48	1	3	1	1	1	0.0	1	1.00	1.00	1
49	1	4	0	0	1	0.0	1	.67	1.00	1
50	1	4	0	1	1	0.0	1	.67	1.00	0
51	1	4	1	0	1	0.0	1	.67	.67	1
52	1	4	1	1	1	0.0	1	.67	.67	1
53	1	5	0	0	0	0.0	1	1.00	.67	0
54	1	5	0	1	0	0.0	1	1.00	.67	1
55	1	5	1	0	0	0.0	1	0.0	1.00	0
56	1	5	1	1	0	0.0	1	0.0	1.00	1
57	1	6	0	0	0	0.0	1	1.00	0.0	1
58	1	6	0	1	0	0.0	1	1.00	0.0	0
59	1	6	1	0	0	0.0	1	.33	1.00	1
60	1	6	1	1	0	0.0	1	.33	1.00	0
61	1	7	1	0	0	.5	1	.33	.33	1
62	1	7	1	1	0	.5	1	.33	.33	1
63	1	8	1	0	1	1.0	1	0.0	.33	1
64	1	8	1	1	1	1.0	1	0.0	.33	1

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Number of cases read = 64 Number of cases listed = 64

Original Values

Message Traffic Variables

Case#	MSGOU1	MSGOU2	MSGOU3	MSGOU4	MSGOU5	TIMOU1	TIMOU2	TIMOU3	TIMOU4	TIMOU5
1	0	2	0	8	7	0	1202	0	361	240
2	12	3	8	12	5	147	152	107	113	356
3	6	3	7	17	9	113	212	151	362	667
4	6	7	9	9	13	89	99	94	161	91
5	2	2	2	19	10	372	646	780	192	430
6	12	10	14	12	20	151	111	138	173	90
7	6	1	3	10	6	117	338	224	234	644
8	13	14	9	20	19	72	124	113	167	76
9	2	2	3	5	6	572	759	754	1103	816
10	16	6	11	10	14	86	74	116	148	106
11	8	8	2	9	8	114	192	814	290	845
12	18	10	0	13	20	76	123	0	148	112
13	12	8	4	11	7	136	128	412	392	1105
14	15	9	8	16	32	90	82	64	126	92
15	7	0	12	7	14	138	0	87	413	561
16	21	3	3	7	13	84	94	64	100	80
17	9	3	2	9	14	93	378	296	345	179
18	6	0	7	10	5	84	0	82	61	64
19	8	3	7	20	10	168	194	104	290	471
20	16	10	5	5	12	68	95	67	98	175
21	6	1	2	8	11	118	667	224	680	549
22	8	5	4	17	16	101	119	54	122	102
23	7	7	6	10	16	110	104	165	304	276
24	21	7	5	14	10	74	91	40	62	58
25	5	3	4	6	8	144	190	327	488	700
26	21	6	13	5	21	112	81	80	121	153
27	6	5	5	4	12	211	187	164	1029	283
28	15	11	8	8	23	56	63	66	129	105
29	8	12	7	0	15	254	133	57	0	623
30	24	34	29	5	26	78	74	63	118	92
31	12	5	3	8	11	86	353	791	329	128
32	21	18	17	22	22	71	99	66	84	150
33	10	9	4	9	29	143	461	314	185	141
34	9	19	3	12	19	179	110	76	198	75
35	9	18	6	8	37	341	170	342	160	123
36	4	19	11	8	18	196	96	150	162	76
37	8	8	5	10	16	472	217	120	148	253
38	7	30	11	10	20	112	68	86	159	134
39	18	19	11	14	27	366	352	121	180	168
40	11	25	10	8	13	92	54	76	105	58
41	6	9	5	4	21	902	327	213	703	560
42	9	24	7	6	22	112	70	92	99	69
43	8	24	12	11	20	420	184	173	125	146
44	9	27	17	6	19	98	66	73	63	73
45	5	9	2	8	20	971	466	449	300	184
46	21	42	7	6	35	110	71	90	123	67
47	7	15	9	10	37	492	245	156	266	108
48	7	16	9	6	29	96	52	107	58	47
49	2	16	6	3	14	900	226	270	422	206
50	14	12	9	5	33	106	79	83	174	54
51	11	8	5	12	25	245	242	154	282	92
52	7	17	16	7	20	62	49	76	92	75
53	6	12	8	4	33	639	302	115	1228	100
54	11	25	12	7	33	102	88	55	80	51
55	6	4	4	6	18	423	531	94	363	81
56	18	12	15	6	16	102	42	84	78	48
57	5	7	5	11	24	885	316	370	400	150
58	19	39	22	17	21	150	101	52	148	117
59	10	10	1	7	35	473	265	410	383	111
60	8	15	4	4	17	121	67	97	74	72
61	22	10	6	4	37	333	296	135	1617	218
62	35	35	7	18	50	100	61	95	139	62
63	13	14	14	17	32	372	265	178	261	464
64	22	46	43	15	56	136	57	80	144	41

Number of cases read = 64 Number of cases listed = 64

Original Values

Message Traffic Variables (Continued)

Case#	MSGIN1	MSGIN2	MSGIN3	MSGIN4	MSGIN5	TIMIN1	TIMIN2	TIMIN3	TIMIN4	TIMIN5	TOTMSG	MAINMSG
1	6	3	7	0	1	731	292	416	0	926	17	8
2	7	10	9	1	13	330	305	104	9	698	41	18
3	8	9	8	3	16	90	55	36	224	401	47	25
4	10	12	9	4	8	32	113	56	93	195	46	21
5	8	7	6	4	9	318	75	177	97	180	36	19
6	14	14	10	13	20	136	84	118	100	328	72	40
7	4	5	5	0	14	21	13	151	0	612	29	20
8	17	14	17	1	25	39	60	60	45	272	76	44
9	2	2	2	5	6	10	14	58	487	249	19	12
10	12	15	14	5	11	64	66	76	99	72	58	25
11	4	4	6	7	14	71	34	76	85	799	37	22
12	12	14	8	5	17	60	130	16	67	271	62	37
13	5	7	7	6	15	17	104	103	151	432	43	22
14	12	16	16	15	12	49	50	24	49	255	80	44
15	9	10	6	8	0	51	73	55	119	0	40	14
16	6	12	10	11	3	66	18	26	41	96	46	16
17	8	6	10	0	8	37	177	71	0	195	37	22
18	6	3	3	3	11	35	28	24	40	22	28	16
19	11	6	7	5	16	33	62	31	217	318	48	26
20	5	8	7	11	15	38	75	67	29	183	49	27
21	7	6	2	0	12	100	70	16	0	964	31	23
22	8	9	15	3	10	14	33	27	38	174	51	26
23	9	7	5	8	13	20	73	43	63	339	48	29
24	11	11	12	6	18	37	36	78	38	156	58	28
25	2	6	4	3	7	34	332	49	43	318	26	15
26	7	12	6	19	18	33	71	54	127	177	68	39
27	9	4	1	3	13	44	91	420	49	185	33	25
28	10	17	13	15	9	19	63	84	170	91	66	32
29	8	12	10	5	9	46	102	91	1730	1478	46	24
30	22	36	13	11	36	110	112	36	1501	416	125	62
31	8	6	10	4	9	82	94	90	82	576	41	20
32	25	13	20	8	39	149	21	77	23	213	107	61
33	14	12	11	10	12	74	369	436	240	162	62	41
34	11	12	15	11	15	28	86	152	57	92	65	34
35	16	17	13	11	16	315	191	192	32	81	82	52
36	13	17	10	6	10	70	48	106	45	98	65	28
37	11	14	1	1	15	214	247	33	59	201	49	31
38	14	22	7	10	20	27	38	64	66	110	78	40
39	18	20	14	9	22	311	304	88	55	209	92	51
40	12	13	10	8	18	32	94	48	50	213	65	31
41	13	9	6	8	0	350	303	40	77	0	45	21
42	21	15	9	10	7	155	80	157	30	83	70	29
43	14	15	17	11	14	180	312	84	38	92	77	34
44	11	24	17	8	17	35	58	38	64	118	81	36
45	9	10	8	5	11	398	377	307	76	267	47	31
46	12	29	13	14	28	64	237	59	36	209	112	63
47	17	17	17	9	8	181	153	484	93	28	79	45
48	6	18	15	6	15	18	27	101	47	55	68	44
49	8	10	9	6	5	444	114	180	34	112	41	19
50	9	21	13	8	20	305	262	106	65	171	78	53
51	8	16	15	0	16	95	86	56	0	134	63	41
52	10	15	17	2	19	23	65	132	42	104	69	39
53	15	10	9	7	12	308	221	37	617	412	64	45
54	3	24	17	19	17	99	100	25	46	66	89	50
55	0	11	11	0	12	0	164	74	0	76	40	30
56	0	23	13	1	27	0	51	60	39	161	68	43
57	11	11	11	5	11	311	293	132	160	234	53	36
58	19	24	22	21	20	96	107	38	88	111	113	41
59	18	12	12	8	9	230	164	291	72	97	64	44
60	12	8	11	5	12	42	32	55	19	67	49	29
61	14	17	15	11	18	60	270	52	242	352	82	55
62	31	33	24	12	41	60	74	57	39	100	147	91
63	21	20	16	13	15	146	54	74	92	257	92	47
64	28	45	24	36	51	46	73	44	50	135	191	107

Number of cases read = 64 Number of cases listed = 64

Original Values

Plot Information Variables

Case#	RAD1	RAD2	RAD3	S1	S2	S3	SRCH1	SRCH2	SRCH3
1	756	9999	1167	745	9999	764	9	99	3
2	183	250	9999	76	71	9999	3	5	99
3	331	1314	450	466	2573	574	17	19	12
4	833	171	350	629	123	212	5	20	2
5	264	9999	875	251	9999	750	7	99	4
6	175	9999	200	106	9999	0	5	99	1
7	275	331	450	171	171	404	5	8	4
8	134	242	240	110	115	158	14	15	10
9	253	241	300	190	161	0	10	9	1
10	200	238	200	100	48	122	7	10	5
11	250	261	433	129	134	493	7	9	3
12	223	268	310	117	116	114	14	11	5
13	290	684	200	134	562	0	5	7	1
14	276	421	220	103	483	164	10	7	5
15	388	184	300	103	155	158	6	13	5
16	250	156	364	58	110	253	11	12	7
17	440	203	288	114	164	154	12	23	9
18	300	233	420	100	103	27	6	7	5
19	235	262	333	119	166	247	6	10	3
20	340	300	200	114	76	0	8	9	1
21	560	526	333	365	565	247	8	7	3
22	317	325	338	236	126	221	8	6	4
23	290	367	500	134	197	71	6	6	2
24	248	370	378	113	228	184	8	5	9
25	536	250	440	273	184	222	8	9	5
26	304	271	412	179	160	210	9	9	4
27	295	276	412	179	194	243	14	9	4
28	340	450	281	238	191	239	6	7	11
29	524	300	345	104	143	279	8	13	12
30	341	477	353	136	326	194	14	20	18
31	350	222	182	0	205	169	1	4	11
32	230	262	270	75	129	152	11	18	15
33	600	889	100	583	1367	0	5	21	1
34	9999	658	150	9999	592	71	99	10	2
35	812	538	267	774	350	202	14	11	3
36	383	417	600	535	419	0	4	7	2
37	315	1379	100	384	3091	0	5	12	1
38	824	458	600	1842	405	636	7	17	4
39	456	241	670	605	161	836	10	9	5
40	483	238	250	448	48	0	7	9	1
41	238	9999	9999	125	9999	9999	5	99	99
42	300	300	400	0	147	0	2	7	4
43	211	720	340	164	718	182	9	10	8
44	156	294	300	94	148	200	8	8	10
45	300	275	150	265	157	71	6	7	2
46	175	450	467	65	355	462	11	7	5
47	183	102	300	137	128	100	7	3	3
48	270	281	275	192	199	96	5	7	6
49	212	150	450	165	87	71	4	3	2
50	217	500	367	151	356	115	13	4	7
51	325	300	433	160	141	58	13	2	3
52	264	292	400	199	181	0	12	3	7
53	450	350	100	191	212	0	7	2	2
54	233	706	275	76	1614	96	11	10	5
55	333	201	400	153	196	141	6	9	4
56	229	500	800	158	0	200	13	1	3
57	450	322	300	191	342	141	6	9	2
58	383	203	300	232	179	110	8	19	6
59	433	10	400	153	0	0	4	2	1
60	308	300	300	204	200	173	4	4	3
61	405	695	190	339	1440	175	9	13	10
62	286	339	423	145	180	273	16	18	15
63	219	1417	500	195	1652	141	10	13	5
64	277	317	271	125	136	111	21	18	7

Number of cases read = 64 Number of cases listed = 64

Original Values
Performance Variables

Case#	COM1	COM2	COM3	COMORG	PH1	PH2	PH3	PHORG	H1	H2	H3	H4	H5	N1	N2	N3	N4	N5
1	15	19	8	14	0	0	0	0	.79	.81	.67	1.00	.62	4	4	5	2	3
2	27	38	38	29	1	6	4	1	.60	.55	.74	1.00	.75	5	5	6	2	4
3	34	52	40	6	8	0	0	0	.46	.63	.69	.08	.28	4	2	4	3	5
4	25	45	58	37	0	6	0	0	.35	.63	.81	0.0	.67	5	2	4	2	5
5	35	999	29	11	0	0	0	0	.48	.60	.42	.25	.12	4	5	5	1	2
6	39	999	49	35	6	0	0	0	.30	.47	.48	.63	.40	5	5	4	2	5
7	48	90	50	23	0	0	0	0	.63	.37	.79	.50	.50	6	5	6	2	4
8	55	110	70	39	2	5	0	6	.73	.25	1.00	.50	.44	5	4	5	2	3
9	41	23	28	21	8	0	0	0	.56	.75	.72	.08	.75	4	2	5	3	3
10	55	96	72	57	0	0	0	0	.70	.75	.77	0.0	.50	5	5	4	2	6
11	51	110	41	19	4	0	0	0	.38	.69	.58	.42	.42	4	4	7	3	3
12	67	60	89	48	20	4	0	0	.50	.68	.80	.50	.95	3	5	5	2	5
13	37	40	41	33	0	0	0	0	.38	.85	.81	0.0	.43	4	5	4	2	6
14	73	58	62	29	0	0	0	0	.42	.85	.80	0.0	.56	3	5	5	2	6
15	66	55	63	42	99	99	99	99	.63	.81	.75	.08	.57	4	4	5	3	6
16	59	61	57	43	99	99	99	99	.70	1.00	.23	0.0	.29	5	4	4	2	3
17	59	42	74	40	8	2	0	0	.33	.92	.54	.42	.17	6	3	6	3	3
18	34	45	45	38	0	0	0	0	.63	.88	.75	.50	.33	4	2	4	2	3
19	57	47	76	49	0	0	0	0	.38	.79	.74	.44	.13	5	6	6	4	2
20	46	57	62	23	0	0	17	4	.42	.88	.73	.50	.63	6	4	4	2	2
21	37	41	53	70	0	0	8	0	.45	.65	.63	.08	.17	5	6	6	3	3
22	52	60	62	64	0	0	0	0	.33	.79	1.00	0.0	.81	3	4	3	2	4
23	60	58	60	75	0	0	0	0	.22	.67	.63	0.0	.10	3	5	6	2	5
24	74	106	69	41	0	0	18	0	.35	.79	.67	0.0	.33	5	4	4	2	3
25	43	32	45	85	4	0	0	0	0.0	1.00	.67	9.99	.85	2	3	6	9	5
26	60	56	93	54	2	0	0	0	.50	.88	.73	9.99	.50	4	4	4	9	2
27	54	46	60	85	0	0	0	0	.61	.75	.42	.25	.63	4	3	6	1	4
28	61	40	78	61	0	0	2	1	.84	.64	.69	9.99	.75	2	3	4	9	2
29	43	20	47	137	0	0	0	0	.44	.75	.63	9.99	.50	4	3	2	9	6
30	79	106	119	111	0	0	6	0	1.00	.70	1.00	9.99	.61	1	5	1	9	6
31	42	30	42	194	0	0	0	0	.25	.79	.63	.42	.73	2	6	6	3	4
32	101	112	144	107	0	0	27	0	.25	.56	.65	.50	.72	2	3	5	2	4
33	27	23	3	26	99	99	99	99	.63	.50	.67	.75	.56	4	4	5	2	6
34	24	13	15	17	99	99	99	99	.50	.48	.65	.25	.81	3	5	5	1	4
35	49	42	22	33	0	0	0	0	.45	.58	.70	.50	.35	5	5	6	1	5
36	30	34	16	32	0	0	0	0	.56	.50	.62	.25	.46	4	2	5	1	5
37	38	30	16	23	0	0	0	0	.83	.81	.79	9.99	.61	3	7	6	9	4
38	72	44	31	36	3	0	0	0	.83	.88	.54	.75	.39	3	4	3	2	4
39	42	67	39	36	0	0	0	0	.65	.65	.65	.50	.79	5	5	5	1	6
40	31	53	27	36	0	12	0	0	.59	.79	.75	.38	.73	2	4	4	1	4
41	63	27	26	93	0	1	14	0	.64	.58	.75	.56	.55	5	3	7	4	5
42	63	54	30	30	0	0	0	0	.33	.38	.50	.75	.75	4	2	2	2	2
43	73	61	45	50	0	0	0	0	.38	.46	.69	.45	.75	6	6	4	5	7
44	69	49	29	51	0	0	4	0	.48	.50	.75	.50	.50	5	3	4	2	3
45	49	42	25	40	0	0	0	0	.81	.77	.85	.38	.46	4	4	4	2	6
46	73	51	40	49	0	0	0	0	1.00	.67	.80	.38	.80	4	5	5	2	5
47	54	49	49	100	0	0	0	0	.67	.50	9.99	.75	.63	6	5	9	4	4
48	85	79	36	46	0	0	5	0	.75	.50	9.99	.75	.88	4	4	9	2	2
49	45	42	28	53	0	0	0	0	.70	.56	1.00	9.99	.38	6	4	1	9	2
50	66	46	39	34	0	0	0	0	.77	.67	.67	9.99	.50	5	3	3	9	2
51	57	54	40	81	0	0	0	0	.71	.56	.65	.44	.56	6	4	5	4	4
52	77	69	33	36	0	0	4	0	.65	.50	1.00	.50	.63	6	2	2	2	6
53	53	37	32	80	0	0	2	0	.75	.42	.50	.44	.79	3	3	2	4	6
54	97	78	51	50	0	2	0	2	.92	.65	.67	.50	.75	4	5	6	2	5
55	36	31	37	85	0	8	0	0	.82	.50	.83	.25	.70	4	2	6	1	7
56	49	39	34	41	0	13	0	0	.92	1.00	.88	9.99	.83	4	1	4	9	5
57	24	41	27	100	0	5	6	0	.52	.38	.50	.60	.38	5	4	3	5	4
58	57	57	48	23	0	22	0	0	.70	.31	.44	.50	.56	5	4	4	2	4
59	25	51	26	72	0	0	0	0	.57	.42	.94	.25	.63	5	3	4	1	6
60	52	52	37	34	0	0	0	0	.81	.50	1.00	9.99	.75	5	2	2	9	3
61	52	65	42	155	0	0	0	0	.69	.67	.92	.50	.67	4	7	4	1	6
62	85	73	84	93	0	0	0	0	.83	.53	1.00	.25	.75	3	9	1	1	3
63	59	66	43	75	2	0	0	0	.69	.67	.69	.25	.73	4	3	4	1	7
64	140	129	93	97	15	5	0	0	.63	.75	.63	9.99	.83	4	9	5	9	5

Number of cases read = 64 Number of cases listed = 64

Original Values

Strike Variables

Case#	Q	TT	ET	LAT
1	0	28	28	0
2	10	29	25	7
3	18	17	15	7
4	4	18	18	0
5	2	20	16	0
6	30	21	10	1
7	10	22	13	0
8	30	23	12	0
9	22	21	20	11
10	36	21	7	5
11	20	20	19	3
12	74	21	5	0
13	4	19	18	7
14	33	20	9	0
15	12	18	14	1
16	60	18	7	0
17	20	15	6	0
18	20	16	6	0
19	20	19	10	10
20	20	20	10	6
21	18	14	7	4
22	15	15	8	8
23	48	15	10	6
24	8	15	11	0
25	0	13	13	0
26	38	14	5	7
27	31	12	7	6
28	12	13	4	0
29	80	32	19	10
30	10	32	18	8
31	0	28	28	0
32	26	29	20	19
33	0	31	31	0
34	8	32	20	0
35	24	27	15	0
36	37	27	11	0
37	28	22	11	11
38	38	23	5	0
39	52	20	11	2
40	2	20	9	7
41	31	18	5	0
42	32	19	10	7
43	80	17	5	0
44	6	18	4	0
45	40	18	8	0
46	56	18	8	0
47	54	18	6	0
48	32	18	1	0
49	36	18	9	0
50	14	18	13	0
51	42	16	9	0
52	0	16	16	0
53	32	22	15	7
54	18	22	14	0
55	56	19	11	8
56	4	19	2	0
57	10	15	12	6
58	78	16	6	0
59	0	6	6	0
60	61	6	0	0
61	72	23	19	7
62	22	24	3	0
63	58	19	12	1
64	10	20	14	0

Number of cases read = 64 Number of cases listed = 64

Original Values

EPU Losses Variables

Case#	EPU1	EPU2	EPU3	EPUN	EPUORG	BGEPU	ER
1	0	0	0	0	0	0	0.0
2	30	6	50	0	5	86	17.20
3	0	0	1	0	0	1	.50
4	4	2	0	0	0	6	3.00
5	0	0	0	0	0	0	0.0
6	0	0	0	6	26	6	.23
7	2	0	0	0	0	2	1.00
8	33	0	2	0	40	35	.88
9	0	0	0	0	47	0	0.0
10	0	0	0	0	6	0	0.0
11	4	2	0	8	0	14	7.00
12	92	2	2	0	25	96	3.84
13	2	0	0	0	4	2	.50
14	0	0	0	0	19	0	0.0
15	999	999	999	99	99	999	99.99
16	999	999	999	99	99	999	99.99
17	4	0	0	0	22	4	.18
18	2	0	0	0	20	2	.10
19	0	0	0	0	16	0	0.0
20	2	37	40	57	19	136	7.15
21	8	4	0	0	4	12	3.00
22	12	0	0	0	44	12	.27
23	0	0	0	0	16	0	0.0
24	68	42	0	0	37	110	2.97
25	0	2	0	0	37	2	.05
26	0	0	0	5	12	4	.33
27	4	0	0	0	0	4	2.00
28	2	0	0	0	9	2	.22
29	0	0	0	0	0	0	0.0
30	2	0	0	10	82	12	.15
31	0	0	0	0	10	0	0.0
32	10	33	11	4	36	58	1.61
33	999	999	999	99	99	999	99.99
34	999	999	999	99	99	999	99.99
35	0	0	0	0	2	0	0.0
36	0	0	0	0	52	0	0.0
37	0	0	0	0	0	0	0.0
38	115	0	0	0	16	115	7.19
39	0	0	0	0	0	0	0.0
40	11	0	0	0	3	11	3.67
41	4	0	0	2	6	6	1.00
42	0	0	0	0	14	0	0.0
43	0	0	0	0	14	0	0.0
44	0	0	0	0	22	0	0.0
45	0	0	0	0	4	0	0.0
46	33	20	0	0	86	53	.62
47	0	0	0	0	6	0	0.0
48	21	50	0	11	33	82	2.48
49	0	0	0	0	0	0	0.0
50	0	0	0	0	32	0	0.0
51	0	0	0	0	4	0	0.0
52	77	11	0	0	31	88	2.84
53	0	0	0	0	61	0	0.0
54	45	126	0	0	80	171	2.14
55	2	0	2	0	0	4	2.00
56	2	0	6	0	28	8	.29
57	0	0	0	0	15	0	0.0
58	0	0	0	0	13	0	0.0
59	0	0	0	0	0	0	0.0
60	0	0	0	0	0	0	0.0
61	0	0	0	0	4	0	0.0
62	4	0	0	0	54	4	.07
63	0	0	0	0	4	0	0.0
64	11	0	33	0	22	43	1.95

Number of cases read = 64 Number of cases listed = 64

Normalized Values
Sequencing and Parameter Variables

Case#	GROUP	SESS	DAY	HALF	ORGAN	SENOR	SIGINT	SCEN	SCENT	COMMS
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.67	9.99	0.0
2	0.0	0.0	0.0	1.00	0.0	0.0	0.0	.67	9.99	0.0
3	0.0	0.0	1.00	0.0	0.0	0.0	0.0	0.0	.67	0.0
4	0.0	0.0	1.00	1.00	0.0	0.0	0.0	0.0	.67	0.0
5	0.0	.13	0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.0
6	0.0	.13	0.0	1.00	1.00	0.0	0.0	1.00	0.0	1.00
7	0.0	.13	1.00	0.0	1.00	0.0	0.0	0.0	1.00	1.00
8	0.0	.13	1.00	1.00	1.00	0.0	0.0	0.0	1.00	0.0
9	0.0	.25	0.0	0.0	0.0	0.0	0.0	.67	0.0	1.00
10	0.0	.25	0.0	1.00	0.0	0.0	0.0	.67	0.0	0.0
11	0.0	.25	1.00	0.0	0.0	0.0	0.0	.67	.67	1.00
12	0.0	.25	1.00	1.00	0.0	0.0	0.0	.67	.67	1.00
13	0.0	.38	0.0	0.0	1.00	0.0	0.0	1.00	.67	0.0
14	0.0	.38	0.0	1.00	1.00	0.0	0.0	1.00	.67	0.0
15	0.0	.38	1.00	0.0	1.00	0.0	0.0	.67	1.00	0.0
16	0.0	.38	1.00	1.00	1.00	0.0	0.0	.67	1.00	0.0
17	0.0	.50	0.0	0.0	1.00	0.0	0.0	.67	.67	0.0
18	0.0	.50	0.0	1.00	1.00	0.0	0.0	.67	.67	0.0
19	0.0	.50	1.00	0.0	1.00	0.0	0.0	.33	.67	0.0
20	0.0	.50	1.00	1.00	1.00	0.0	0.0	.33	.67	0.0
21	0.0	.63	0.0	0.0	1.00	0.0	0.0	.67	.33	0.0
22	0.0	.63	0.0	1.00	1.00	0.0	0.0	.67	.33	1.00
23	0.0	.63	1.00	0.0	1.00	0.0	0.0	.33	.67	0.0
24	0.0	.63	1.00	1.00	1.00	0.0	0.0	.33	.67	1.00
25	0.0	.75	0.0	0.0	1.00	0.0	0.0	.67	.33	0.0
26	0.0	.75	0.0	1.00	1.00	0.0	0.0	.67	.33	1.00
27	0.0	.75	1.00	0.0	1.00	0.0	0.0	1.00	.67	0.0
28	0.0	.75	1.00	1.00	1.00	0.0	0.0	1.00	.67	0.0
29	0.0	.88	0.0	0.0	0.0	.50	0.0	.67	1.00	0.0
30	0.0	.88	0.0	1.00	0.0	.50	0.0	.67	1.00	1.00
31	0.0	1.00	0.0	0.0	1.00	1.00	0.0	.67	.67	0.0
32	0.0	1.00	0.0	1.00	1.00	1.00	0.0	.67	.67	0.0
33	1.00	0.0	0.0	0.0	1.00	0.0	0.0	1.00	9.99	1.00
34	1.00	0.0	0.0	1.00	1.00	0.0	0.0	1.00	9.99	0.0
35	1.00	0.0	1.00	0.0	1.00	0.0	0.0	.33	1.00	1.00
36	1.00	0.0	1.00	1.00	1.00	0.0	0.0	.33	1.00	0.0
37	1.00	.13	0.0	0.0	0.0	0.0	0.0	1.00	.33	1.00
38	1.00	.13	0.0	1.00	0.0	0.0	0.0	1.00	.33	0.0
39	1.00	.13	1.00	0.0	0.0	0.0	0.0	.67	1.00	1.00
40	1.00	.13	1.00	1.00	0.0	0.0	0.0	.67	1.00	0.0
41	1.00	.25	0.0	0.0	0.0	0.0	0.0	.67	.67	0.0
42	1.00	.25	0.0	1.00	0.0	0.0	0.0	.67	.67	0.0
43	1.00	.25	1.00	0.0	0.0	0.0	0.0	.33	.67	0.0
44	1.00	.25	1.00	1.00	0.0	0.0	0.0	.33	.67	0.0
45	1.00	.38	0.0	0.0	1.00	0.0	1.00	1.00	.33	1.00
46	1.00	.38	0.0	1.00	1.00	0.0	1.00	1.00	.33	1.00
47	1.00	.38	1.00	0.0	1.00	0.0	1.00	1.00	1.00	1.00
48	1.00	.38	1.00	1.00	1.00	0.0	1.00	1.00	1.00	1.00
49	1.00	.50	0.0	0.0	1.00	0.0	1.00	.67	1.00	1.00
50	1.00	.50	0.0	1.00	1.00	0.0	1.00	.67	1.00	0.0
51	1.00	.50	1.00	0.0	1.00	0.0	1.00	.67	.67	1.00
52	1.00	.50	1.00	1.00	1.00	0.0	1.00	.67	.67	1.00
53	1.00	.63	0.0	0.0	0.0	0.0	1.00	1.00	.67	0.0
54	1.00	.63	0.0	1.00	0.0	0.0	1.00	1.00	.67	1.00
55	1.00	.63	1.00	0.0	0.0	0.0	1.00	0.0	1.00	0.0
56	1.00	.63	1.00	1.00	0.0	0.0	1.00	0.0	1.00	1.00
57	1.00	.75	0.0	0.0	0.0	0.0	1.00	1.00	0.0	1.00
58	1.00	.75	0.0	1.00	0.0	0.0	1.00	1.00	0.0	0.0
59	1.00	.75	1.00	0.0	0.0	0.0	1.00	.33	1.00	1.00
60	1.00	.75	1.00	1.00	0.0	0.0	1.00	.33	1.00	0.0
61	1.00	.88	1.00	0.0	0.0	.50	1.00	.33	.33	1.00
62	1.00	.88	1.00	1.00	0.0	.50	1.00	.33	.33	1.00
63	1.00	1.00	1.00	0.0	1.00	1.00	1.00	0.0	.33	1.00
64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.0	.33	1.00

Number of cases read = 64 Number of cases listed = 64

Normalized Values
Message Traffic Variables

Case#	MSGOU1	MSGOU2	MSGOU3	MSGOU4	MSGOU5	TIMOU1	TIMOU2	TIMOU3	TIMOU4	TIMOU5
1	1.00	.96	1.00	.86	.88	1.00	.26	1.00	.78	.85
2	.79	.95	.86	.79	.91	.91	.91	.93	.93	.78
3	.89	.95	.88	.70	.84	.93	.87	.91	.78	.59
4	.89	.88	.84	.84	.77	.94	.94	.94	.90	.94
5	.96	.96	.96	.66	.82	.77	.60	.52	.88	.73
6	.79	.82	.75	.79	.64	.91	.93	.91	.89	.94
7	.89	.98	.95	.82	.89	.93	.79	.86	.86	.60
8	.77	.75	.84	.64	.66	.96	.92	.93	.90	.95
9	.96	.96	.95	.91	.89	.65	.53	.53	.32	.50
10	.71	.89	.80	.82	.75	.95	.95	.93	.91	.93
11	.86	.86	.96	.84	.86	.93	.88	.50	.82	.48
12	.68	.82	1.00	.77	.64	.95	.92	1.00	.91	.93
13	.79	.86	.93	.80	.88	.92	.92	.75	.76	.32
14	.73	.84	.86	.71	.43	.94	.95	.96	.92	.94
15	.88	1.00	.79	.88	.75	.91	1.00	.95	.74	.65
16	.63	.95	.95	.88	.77	.95	.94	.96	.94	.95
17	.84	.95	.96	.84	.75	.94	.77	.82	.79	.89
18	.89	1.00	.88	.82	.91	.95	1.00	.95	.96	.96
19	.86	.95	.88	.64	.82	.90	.88	.94	.82	.71
20	.71	.82	.91	.91	.79	.96	.94	.96	.94	.89
21	.89	.98	.96	.86	.80	.93	.59	.86	.58	.66
22	.86	.91	.93	.70	.71	.94	.93	.97	.92	.94
23	.88	.88	.89	.82	.71	.93	.94	.90	.81	.83
24	.63	.88	.91	.75	.82	.95	.94	.98	.96	.96
25	.91	.95	.93	.89	.86	.91	.88	.80	.70	.57
26	.63	.89	.77	.91	.63	.93	.95	.95	.93	.91
27	.89	.91	.91	.93	.79	.87	.88	.90	.36	.82
28	.73	.80	.86	.86	.59	.97	.96	.96	.92	.94
29	.86	.79	.88	1.00	.73	.84	.92	.96	1.00	.61
30	.57	.39	.48	.91	.54	.95	.95	.96	.93	.94
31	.79	.91	.95	.86	.80	.95	.78	.51	.80	.92
32	.63	.68	.70	.61	.61	.96	.94	.96	.95	.91
33	.82	.84	.93	.84	.48	.91	.71	.81	.89	.91
34	.84	.66	.95	.79	.66	.89	.93	.95	.88	.95
35	.84	.68	.89	.86	.34	.79	.89	.79	.90	.92
36	.93	.66	.80	.86	.68	.88	.94	.91	.90	.95
37	.86	.86	.91	.82	.71	.71	.87	.93	.91	.84
38	.88	.46	.80	.82	.64	.93	.96	.95	.90	.92
39	.68	.66	.80	.75	.52	.77	.78	.93	.89	.90
40	.80	.55	.82	.86	.77	.94	.97	.95	.94	.96
41	.89	.84	.91	.93	.63	.44	.80	.87	.57	.65
42	.84	.57	.88	.89	.61	.93	.96	.94	.94	.96
43	.86	.57	.79	.80	.64	.74	.89	.89	.92	.91
44	.84	.52	.70	.89	.66	.94	.96	.95	.96	.95
45	.91	.84	.96	.86	.64	.40	.71	.72	.81	.89
46	.63	.25	.88	.89	.38	.93	.96	.94	.92	.96
47	.88	.73	.84	.82	.34	.70	.85	.90	.84	.93
48	.88	.71	.84	.89	.48	.94	.97	.93	.96	.97
49	.96	.71	.89	.95	.75	.44	.86	.83	.74	.87
50	.75	.79	.84	.91	.41	.93	.95	.95	.89	.97
51	.80	.86	.91	.79	.55	.85	.85	.90	.83	.94
52	.88	.70	.71	.88	.64	.96	.97	.95	.94	.95
53	.89	.79	.86	.93	.41	.60	.81	.93	.24	.94
54	.80	.55	.79	.88	.41	.94	.95	.97	.95	.97
55	.89	.93	.93	.89	.68	.74	.67	.94	.78	.95
56	.68	.79	.73	.89	.71	.94	.97	.95	.95	.97
57	.91	.88	.91	.80	.57	.45	.80	.77	.75	.91
58	.66	.30	.61	.70	.63	.91	.94	.97	.91	.93
59	.82	.82	.98	.88	.38	.71	.84	.75	.76	.93
60	.86	.73	.93	.93	.70	.93	.96	.94	.95	.96
61	.61	.82	.89	.93	.34	.79	.82	.92	0.0	.87
62	.38	.38	.88	.68	.11	.94	.96	.94	.91	.96
63	.77	.75	.75	.70	.43	.77	.84	.89	.84	.71
64	.61	.18	.23	.73	0.0	.92	.96	.95	.91	.97

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Message Traffic Variables (Continued)

Case#	WKLD1	WKLD2	WKLD3	WKLD4	WKLD5	BGWKLD	SYSWKLD	MSGIN1	MSGIN2	MSGIN3
1	1.00	.25	1.00	.67	.75	.75	.73	.88	.94	.86
2	.71	.86	.80	.73	.71	.79	.76	.86	.80	.82
3	.83	.82	.79	.54	.49	.82	.70	.84	.82	.84
4	.84	.82	.79	.76	.72	.82	.79	.80	.76	.82
5	.74	.58	.50	.58	.60	.61	.60	.84	.86	.88
6	.71	.77	.69	.70	.61	.72	.69	.73	.73	.80
7	.83	.78	.82	.70	.54	.81	.73	.92	.90	.90
8	.73	.69	.78	.58	.63	.74	.68	.67	.73	.67
9	.62	.51	.51	.29	.44	.55	.47	.96	.96	.96
10	.68	.85	.75	.75	.70	.76	.74	.76	.71	.73
11	.80	.76	.48	.69	.41	.68	.63	.92	.92	.88
12	.65	.76	1.00	.70	.60	.80	.74	.76	.73	.84
13	.72	.79	.69	.61	.28	.73	.62	.90	.86	.86
14	.69	.80	.82	.66	.40	.77	.67	.76	.69	.69
15	.80	1.00	.74	.65	.49	.85	.74	.82	.80	.88
16	.59	.89	.91	.82	.73	.80	.79	.88	.76	.80
17	.79	.73	.79	.66	.67	.77	.73	.84	.88	.80
18	.85	1.00	.83	.79	.87	.89	.87	.88	.94	.94
19	.77	.83	.82	.53	.58	.81	.71	.78	.88	.86
20	.68	.77	.87	.86	.70	.78	.78	.90	.84	.86
21	.83	.58	.83	.50	.53	.75	.65	.86	.88	.96
22	.80	.84	.90	.64	.67	.85	.77	.84	.82	.71
23	.82	.82	.80	.67	.59	.81	.74	.82	.86	.90
24	.60	.83	.89	.72	.79	.77	.76	.78	.78	.76
25	.83	.84	.74	.62	.49	.80	.70	.96	.88	.92
26	.58	.85	.73	.84	.57	.72	.71	.86	.76	.88
27	.78	.81	.82	.34	.65	.80	.68	.82	.92	.98
28	.71	.77	.82	.79	.55	.77	.73	.80	.67	.75
29	.72	.72	.84	1.00	.45	.76	.75	.84	.76	.80
30	.54	.37	.46	.84	.51	.46	.55	.57	.29	.75
31	.74	.71	.48	.68	.74	.65	.67	.84	.88	.80
32	.60	.64	.67	.58	.55	.63	.61	.51	.75	.61
33	.75	.60	.75	.74	.44	.70	.66	.73	.76	.78
34	.75	.62	.90	.69	.63	.75	.72	.78	.76	.71
35	.66	.61	.70	.77	.31	.66	.61	.69	.67	.75
36	.82	.62	.73	.77	.65	.72	.72	.75	.67	.80
37	.61	.74	.84	.75	.60	.73	.71	.78	.73	.98
38	.81	.44	.76	.74	.59	.67	.67	.73	.57	.86
39	.52	.52	.74	.67	.46	.60	.58	.65	.61	.73
40	.76	.54	.78	.80	.74	.69	.72	.76	.75	.80
41	.39	.67	.79	.52	.41	.62	.56	.75	.82	.88
42	.78	.55	.83	.84	.58	.72	.71	.59	.71	.82
43	.63	.51	.70	.74	.58	.61	.63	.73	.71	.67
44	.79	.50	.66	.86	.63	.65	.69	.78	.53	.67
45	.36	.60	.70	.70	.57	.55	.59	.82	.80	.84
46	.58	.24	.83	.82	.36	.55	.57	.76	.43	.75
47	.61	.62	.76	.69	.32	.66	.60	.67	.67	.67
48	.82	.69	.78	.86	.47	.77	.73	.88	.65	.71
49	.43	.61	.74	.70	.65	.60	.63	.84	.80	.82
50	.70	.75	.80	.81	.40	.75	.69	.82	.59	.75
51	.68	.73	.82	.65	.52	.74	.68	.84	.69	.71
52	.84	.68	.68	.83	.61	.73	.73	.80	.71	.67
53	.54	.64	.80	.22	.39	.66	.52	.71	.80	.82
54	.75	.52	.76	.83	.40	.68	.65	.94	.53	.67
55	.66	.62	.87	.69	.64	.72	.70	1.00	.78	.78
56	.64	.77	.69	.85	.69	.70	.73	1.00	.55	.75
57	.41	.70	.70	.60	.52	.61	.59	.78	.78	.78
58	.60	.28	.59	.63	.58	.49	.54	.63	.53	.57
59	.58	.69	.73	.67	.35	.67	.60	.65	.76	.76
60	.79	.70	.87	.89	.67	.79	.78	.76	.84	.78
61	.48	.67	.82	0.0	.29	.66	.45	.73	.67	.71
62	.35	.36	.82	.62	.10	.51	.45	.39	.35	.53
63	.59	.63	.67	.58	.31	.63	.56	.59	.61	.69
64	.56	.17	.22	.67	0.0	.32	.32	.45	.12	.53

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Message Traffic Variables (Continued)

Case#	MSGIN4	MSGIN5	BGMSGIN	SYSMSGIN	TIMIN1	TIMIN2	TIMIN3	TIMIN4	TIMIN5
1	1.00	.98	.90	.93	.58	.83	.76	1.00	.46
2	.98	.75	.83	.84	.81	.82	.94	.99	.60
3	.94	.69	.84	.83	.95	.97	.98	.87	.77
4	.92	.84	.80	.83	.98	.93	.97	.95	.89
5	.92	.82	.86	.87	.82	.96	.90	.94	.90
6	.75	.61	.75	.72	.92	.95	.93	.94	.81
7	1.00	.73	.91	.89	.99	.99	.91	1.00	.65
8	.98	.51	.69	.71	.98	.97	.97	.97	.84
9	.90	.88	.96	.93	.99	.99	.97	.72	.86
10	.90	.78	.73	.78	.96	.96	.96	.94	.96
11	.86	.73	.91	.86	.96	.98	.96	.95	.54
12	.90	.67	.78	.78	.97	.92	.99	.96	.84
13	.88	.71	.88	.84	.99	.94	.94	.91	.75
14	.71	.76	.71	.72	.97	.97	.99	.97	.85
15	.84	1.00	.84	.87	.97	.96	.97	.93	1.00
16	.78	.94	.82	.84	.96	.99	.98	.98	.94
17	1.00	.84	.84	.87	.98	.90	.96	1.00	.89
18	.94	.78	.92	.90	.98	.98	.99	.98	.99
19	.90	.69	.84	.82	.98	.96	.98	.87	.82
20	.78	.71	.87	.82	.98	.96	.96	.98	.89
21	1.00	.76	.90	.89	.94	.96	.99	1.00	.44
22	.94	.80	.79	.82	.99	.98	.98	.98	.90
23	.84	.75	.86	.84	.99	.96	.98	.96	.80
24	.88	.65	.78	.77	.98	.98	.95	.98	.91
25	.94	.86	.92	.91	.98	.81	.97	.98	.82
26	.63	.65	.84	.76	.98	.96	.97	.93	.90
27	.94	.75	.91	.88	.97	.95	.76	.97	.89
28	.71	.82	.74	.75	.99	.96	.95	.90	.95
29	.90	.82	.80	.83	.97	.94	.95	0.0	.15
30	.78	.29	.54	.54	.94	.94	.98	.13	.76
31	.92	.82	.84	.85	.95	.95	.95	.95	.67
32	.84	.24	.62	.59	.91	.99	.96	.99	.88
33	.80	.76	.76	.77	.96	.79	.75	.86	.91
34	.78	.71	.75	.75	.98	.95	.91	.97	.95
35	.78	.69	.70	.71	.82	.89	.89	.98	.95
36	.88	.80	.74	.78	.96	.97	.94	.97	.94
37	.98	.71	.83	.84	.88	.86	.98	.97	.88
38	.80	.61	.72	.71	.98	.98	.96	.96	.94
39	.82	.57	.66	.67	.82	.82	.95	.97	.88
40	.84	.65	.77	.76	.98	.95	.97	.97	.88
41	.84	1.00	.82	.86	.80	.82	.98	.96	1.00
42	.80	.86	.71	.76	.91	.95	.91	.98	.95
43	.78	.73	.70	.72	.90	.82	.95	.98	.95
44	.84	.67	.66	.70	.98	.97	.98	.96	.93
45	.90	.78	.82	.83	.77	.78	.82	.96	.85
46	.73	.45	.65	.62	.96	.86	.97	.98	.88
47	.82	.84	.67	.73	.90	.91	.72	.95	.98
48	.88	.71	.75	.76	.99	.98	.94	.97	.97
49	.88	.90	.82	.85	.74	.93	.90	.98	.94
50	.84	.61	.72	.72	.82	.85	.94	.96	.90
51	1.00	.69	.75	.78	.95	.95	.97	1.00	.92
52	.96	.63	.73	.75	.99	.96	.92	.98	.94
53	.86	.76	.78	.79	.82	.87	.98	.64	.76
54	.63	.67	.71	.69	.94	.94	.99	.97	.96
55	1.00	.76	.86	.87	1.00	.91	.96	1.00	.96
56	.98	.47	.76	.75	1.00	.97	.97	.98	.91
57	.90	.78	.78	.81	.82	.83	.92	.91	.86
58	.59	.61	.58	.58	.94	.94	.98	.95	.94
59	.84	.82	.73	.77	.87	.91	.83	.96	.94
60	.90	.76	.80	.81	.98	.98	.97	.99	.96
61	.78	.65	.70	.71	.97	.84	.97	.86	.80
62	.76	.20	.42	.45	.97	.96	.97	.98	.94
63	.75	.71	.63	.67	.92	.97	.96	.95	.85
64	.29	0.0	.37	.28	.97	.96	.97	.97	.92

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Message Traffic Variables (Continued)

Case#	BGTIMIN	SYSTIMIN	TOTMSG	MAINMSG	OTHMSG
1	.72	.73	.09	.04	.05
2	.86	.83	.21	.09	.12
3	.97	.91	.25	.13	.12
4	.96	.94	.24	.11	.13
5	.89	.90	.19	.10	.09
6	.93	.91	.38	.21	.17
7	.96	.91	.15	.10	.05
8	.97	.94	.40	.23	.17
9	.98	.91	.10	.06	.04
10	.96	.96	.30	.13	.17
11	.97	.88	.19	.12	.08
12	.96	.94	.32	.19	.13
13	.96	.91	.23	.12	.11
14	.98	.95	.42	.23	.19
15	.97	.97	.21	.07	.14
16	.98	.97	.24	.08	.16
17	.95	.94	.19	.12	.08
18	.98	.98	.15	.08	.06
19	.98	.92	.25	.14	.12
20	.97	.95	.26	.14	.12
21	.96	.87	.16	.12	.04
22	.99	.97	.27	.14	.13
23	.97	.94	.25	.15	.10
24	.97	.96	.30	.15	.16
25	.92	.91	.14	.08	.06
26	.97	.95	.36	.20	.15
27	.89	.91	.17	.13	.04
28	.97	.95	.35	.17	.18
29	.95	.60	.24	.13	.12
30	.95	.75	.65	.32	.33
31	.95	.89	.21	.10	.11
32	.95	.94	.56	.32	.24
33	.83	.85	.32	.21	.11
34	.95	.95	.34	.18	.16
35	.87	.91	.43	.28	.15
36	.96	.96	.34	.15	.19
37	.90	.91	.26	.16	.09
38	.98	.96	.41	.21	.20
39	.86	.89	.48	.27	.21
40	.97	.95	.34	.16	.18
41	.87	.91	.24	.11	.13
42	.92	.94	.37	.15	.21
43	.89	.92	.40	.18	.23
44	.97	.96	.42	.19	.24
45	.79	.84	.25	.16	.08
46	.93	.93	.59	.33	.26
47	.84	.89	.41	.24	.18
48	.97	.97	.36	.23	.13
49	.86	.90	.21	.10	.12
50	.87	.89	.41	.28	.13
51	.95	.96	.33	.21	.12
52	.96	.96	.36	.20	.16
53	.89	.82	.34	.24	.10
54	.96	.96	.47	.26	.20
55	.95	.96	.21	.16	.05
56	.98	.96	.36	.23	.13
57	.86	.87	.28	.18	.09
58	.95	.95	.59	.21	.38
59	.87	.90	.34	.23	.10
60	.98	.98	.26	.15	.10
61	.93	.89	.43	.29	.14
62	.96	.96	.77	.48	.29
63	.95	.93	.48	.25	.24
64	.97	.96	1.00	.56	.44

Number of cases read = 64 Number of cases listed = 64

Normalized Values
Plot Information Variables

Case#	RAD1	RAD2	RAD3	BGRAD	S1	S2	S3	BGS	SRCH1	SRCH2	SRCH3	BGSRCH
1	.53	.	.82	.	.24	.	.25	.	.39	.	.13	.
2	.13	.18	.	.	.02	.02	.	.	.13	.22	.	.
3	.23	.93	.32	.49	.15	.83	.19	.39	.74	.83	.52	.70
4	.59	.12	.25	.32	.20	.04	.07	.10	.22	.87	.09	.39
5	.19	.	.62	.	.08	.	.24	.	.30	.	.17	.
6	.12	.	.14	.	.03	.	0.0	.	.22	.	.04	.
7	.19	.23	.32	.25	.06	.06	.13	.08	.22	.35	.17	.25
8	.09	.17	.17	.14	.04	.04	.05	.04	.61	.65	.43	.57
9	.18	.17	.21	.19	.06	.05	0.0	.04	.43	.39	.04	.29
10	.14	.17	.14	.15	.03	.02	.04	.03	.30	.43	.22	.32
11	.18	.18	.31	.22	.04	.04	.16	.08	.30	.39	.13	.28
12	.16	.19	.22	.19	.04	.04	.04	.04	.61	.48	.22	.43
13	.20	.48	.14	.28	.04	.18	0.0	.08	.22	.30	.04	.19
14	.19	.30	.16	.22	.03	.16	.05	.08	.43	.30	.22	.32
15	.27	.13	.21	.21	.03	.05	.05	.04	.26	.57	.22	.35
16	.18	.11	.26	.18	.02	.04	.08	.05	.48	.52	.30	.43
17	.31	.14	.20	.22	.04	.05	.05	.05	.52	1.00	.39	.64
18	.21	.16	.30	.22	.03	.03	.01	.02	.26	.30	.22	.26
19	.17	.18	.24	.20	.04	.05	.08	.06	.26	.43	.13	.28
20	.24	.21	.14	.20	.04	.02	0.0	.02	.35	.39	.04	.26
21	.40	.37	.24	.33	.12	.18	.08	.13	.35	.30	.13	.26
22	.22	.23	.24	.23	.08	.04	.07	.06	.35	.26	.17	.26
23	.20	.26	.35	.27	.04	.06	.02	.04	.26	.26	.09	.20
24	.18	.26	.27	.23	.04	.07	.06	.06	.35	.22	.39	.32
25	.38	.18	.31	.29	.09	.06	.07	.07	.35	.39	.22	.32
26	.21	.19	.29	.23	.06	.05	.07	.06	.39	.39	.17	.32
27	.21	.19	.29	.23	.06	.06	.08	.07	.61	.39	.17	.39
28	.24	.32	.20	.25	.08	.06	.08	.07	.26	.30	.48	.35
29	.37	.21	.24	.27	.03	.05	.09	.06	.35	.57	.52	.48
30	.24	.34	.25	.28	.04	.11	.06	.07	.61	.87	.78	.75
31	.25	.16	.13	.18	0.0	.07	.05	.04	.04	.17	.48	.23
32	.16	.18	.19	.18	.02	.04	.05	.04	.48	.78	.65	.64
33	.42	.63	.07	.37	.19	.44	0.0	.21	.22	.91	.04	.39
34	.	.46	.11	.	.	.19	.02	.	.	.43	.09	.
35	.57	.38	.19	.38	.25	.11	.07	.14	.61	.48	.13	.41
36	.27	.29	.42	.33	.17	.14	0.0	.10	.17	.30	.09	.19
37	.22	.97	.07	.42	.12	1.00	0.0	.37	.22	.52	.04	.26
38	.58	.32	.42	.44	.60	.13	.21	.31	.30	.74	.17	.41
39	.32	.17	.47	.32	.20	.05	.27	.17	.43	.39	.22	.35
40	.34	.17	.18	.23	.14	.02	0.0	.05	.30	.39	.04	.25
41	.17	.	.	.	.04	.	.	.	.22	.	.	.
42	.21	.21	.28	.24	0.0	.05	0.0	.02	.09	.30	.17	.19
43	.15	.51	.24	.30	.05	.23	.06	.11	.39	.43	.35	.39
44	.11	.21	.21	.18	.03	.05	.06	.05	.35	.35	.43	.38
45	.21	.19	.11	.17	.09	.05	.02	.05	.26	.30	.09	.22
46	.12	.32	.33	.26	.02	.11	.15	.10	.48	.30	.22	.33
47	.13	.07	.21	.14	.04	.04	.03	.04	.30	.13	.13	.19
48	.19	.20	.19	.19	.06	.06	.03	.05	.22	.30	.26	.26
49	.15	.11	.32	.19	.05	.03	.02	.03	.17	.13	.09	.13
50	.15	.35	.26	.25	.05	.12	.04	.07	.57	.17	.30	.35
51	.23	.21	.31	.25	.05	.05	.02	.04	.57	.09	.13	.26
52	.19	.21	.28	.22	.06	.06	0.0	.04	.52	.13	.30	.32
53	.32	.25	.07	.21	.06	.07	0.0	.04	.30	.09	.09	.16
54	.16	.50	.19	.29	.02	.52	.03	.19	.61	.43	.22	.42
55	.24	.14	.28	.22	.05	.06	.05	.05	.26	.39	.17	.28
56	.16	.35	.56	.36	.05	0.0	.06	.04	.57	.04	.13	.25
57	.32	.23	.21	.25	.06	.11	.05	.07	.26	.39	.09	.25
58	.27	.14	.21	.21	.08	.06	.04	.06	.35	.83	.26	.48
59	.31	.01	.28	.20	.05	0.0	0.0	.02	.17	.09	.04	.10
60	.22	.21	.21	.21	.07	.06	.06	.06	.17	.17	.13	.16
61	.29	.49	.13	.30	.11	.47	.06	.21	.39	.57	.43	.46
62	.20	.24	.30	.25	.05	.06	.09	.06	.70	.78	.65	.71
63	.15	1.00	.35	.50	.06	.53	.05	.21	.43	.57	.22	.41
64	.20	.22	.19	.20	.04	.04	.04	.04	.91	.78	.30	.67

Number of cases read = 64 Number of cases listed = 64

Normalized Values
Performance Variables

Case#	COM1	COM2	COM3	BGCOM	COMORG	PH1	PH2	PH3	BGPH	PHORG
1	.08	.10	.04	.12	.07	1.00	1.00	1.00	1.00	1.00
2	.14	.20	.20	.29	.15	.96	.78	.85	.59	.96
3	.18	.27	.21	.35	.03	.70	1.00	1.00	.70	1.00
4	.13	.23	.30	.36	.19	1.00	.78	1.00	.78	1.00
5	.18	.	.15	.	.06	1.00	1.00	1.00	1.00	1.00
6	.20	.	.25	.	.18	.78	1.00	1.00	.78	1.00
7	.25	.46	.26	.53	.12	1.00	1.00	1.00	1.00	1.00
8	.28	.57	.36	.66	.20	.93	.81	1.00	.74	.78
9	.21	.12	.14	.26	.11	.70	1.00	1.00	.70	1.00
10	.28	.49	.37	.62	.29	1.00	1.00	1.00	1.00	1.00
11	.26	.57	.21	.57	.10	.85	1.00	1.00	.85	1.00
12	.35	.31	.46	.61	.25	.26	.85	1.00	.11	1.00
13	.19	.21	.21	.33	.17	1.00	1.00	1.00	1.00	1.00
14	.38	.30	.32	.54	.15	1.00	1.00	1.00	1.00	1.00
15	.34	.28	.32	.52	.22	.	.	.	.	.
16	.30	.31	.29	.50	.22	.	.	.	.	.
17	.30	.22	.38	.49	.21	.70	.93	1.00	.63	1.00
18	.18	.23	.23	.35	.20	1.00	1.00	1.00	1.00	1.00
19	.29	.24	.39	.50	.25	1.00	1.00	1.00	1.00	1.00
20	.24	.29	.32	.46	.12	1.00	1.00	.37	.37	.85
21	.19	.21	.27	.37	.36	1.00	1.00	.70	.70	1.00
22	.27	.31	.32	.49	.33	1.00	1.00	1.00	1.00	1.00
23	.31	.30	.31	.50	.39	1.00	1.00	1.00	1.00	1.00
24	.38	.55	.36	.70	.21	1.00	1.00	.33	.33	1.00
25	.22	.16	.23	.34	.44	.85	1.00	1.00	.85	1.00
26	.31	.29	.48	.59	.28	.93	1.00	1.00	.93	1.00
27	.28	.24	.31	.45	.44	1.00	1.00	1.00	1.00	1.00
28	.31	.21	.40	.50	.31	1.00	1.00	.93	.93	.96
29	.22	.10	.24	.31	.71	1.00	1.00	1.00	1.00	1.00
30	.41	.55	.61	.85	.57	1.00	1.00	.78	.78	1.00
31	.22	.15	.22	.32	1.00	1.00	1.00	1.00	1.00	1.00
32	.52	.58	.74	1.00	.55	1.00	1.00	0.0	0.0	1.00
33	.14	.12	.02	.15	.13	.	.	.	.	.
34	.12	.07	.08	.15	.09	.	.	.	.	.
35	.25	.22	.11	.32	.17	1.00	1.00	1.00	1.00	1.00
36	.15	.18	.08	.22	.16	1.00	1.00	1.00	1.00	1.00
37	.20	.15	.08	.24	.12	1.00	1.00	1.00	1.00	1.00
38	.37	.23	.16	.41	.19	.89	1.00	1.00	.89	1.00
39	.22	.35	.20	.41	.19	1.00	1.00	1.00	1.00	1.00
40	.16	.27	.14	.31	.19	1.00	.56	1.00	.56	1.00
41	.32	.14	.13	.32	.48	1.00	.96	.48	.44	1.00
42	.32	.28	.15	.41	.15	1.00	1.00	1.00	1.00	1.00
43	.38	.31	.23	.50	.26	1.00	1.00	1.00	1.00	1.00
44	.36	.25	.15	.41	.26	1.00	1.00	.85	.85	1.00
45	.25	.22	.13	.32	.21	1.00	1.00	1.00	1.00	1.00
46	.38	.26	.21	.46	.25	1.00	1.00	1.00	1.00	1.00
47	.28	.25	.25	.43	.52	1.00	1.00	1.00	1.00	1.00
48	.44	.41	.19	.56	.24	1.00	1.00	.81	.81	1.00
49	.23	.22	.14	.32	.27	1.00	1.00	1.00	1.00	1.00
50	.34	.24	.20	.42	.18	1.00	1.00	1.00	1.00	1.00
51	.29	.28	.21	.42	.42	1.00	1.00	1.00	1.00	1.00
52	.40	.36	.17	.50	.19	1.00	1.00	.85	.85	1.00
53	.27	.19	.16	.34	.41	1.00	1.00	.93	.93	1.00
54	.50	.40	.26	.63	.26	1.00	.93	1.00	.93	.93
55	.19	.16	.19	.29	.44	1.00	.70	1.00	.70	1.00
56	.25	.20	.18	.34	.21	1.00	.52	1.00	.52	1.00
57	.12	.21	.14	.26	.52	1.00	.81	.78	.59	1.00
58	.29	.29	.25	.45	.12	1.00	.19	1.00	.19	1.00
59	.13	.26	.13	.29	.37	1.00	1.00	1.00	1.00	1.00
60	.27	.27	.19	.39	.18	1.00	1.00	1.00	1.00	1.00
61	.27	.34	.22	.45	.80	1.00	1.00	1.00	1.00	1.00
62	.44	.38	.43	.68	.48	1.00	1.00	1.00	1.00	1.00
63	.30	.34	.22	.47	.39	.93	1.00	1.00	.93	1.00
64	.72	.66	.48	1.01	.50	.44	.81	1.00	.26	1.00

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Performance Variables (Continued)

Case#	H1	H2	H3	H4	H5	BGH	SYSH	FSH
1	.79	.81	.67	1.00	.62	.76	.78	.81
2	.60	.55	.74	1.00	.75	.63	.73	.88
3	.46	.63	.69	.08	.28	.59	.43	.18
4	.35	.63	.81	0.0	.67	.60	.49	.34
5	.48	.60	.42	.25	.12	.50	.37	.19
6	.30	.47	.48	.63	.40	.42	.46	.52
7	.63	.37	.79	.50	.50	.60	.56	.50
8	.73	.25	1.00	.50	.44	.66	.58	.47
9	.56	.75	.72	.08	.75	.68	.57	.42
10	.70	.75	.77	0.0	.50	.74	.54	.25
11	.38	.69	.58	.42	.42	.55	.50	.42
12	.50	.68	.80	.50	.95	.66	.69	.73
13	.38	.85	.81	0.0	.43	.68	.49	.22
14	.42	.85	.80	0.0	.56	.69	.53	.28
15	.63	.81	.75	.08	.57	.73	.57	.32
16	.70	1.00	.23	0.0	.29	.64	.44	.14
17	.33	.92	.54	.42	.17	.60	.48	.30
18	.63	.88	.75	.50	.33	.75	.62	.42
19	.38	.79	.74	.44	.13	.64	.50	.29
20	.42	.88	.73	.50	.63	.68	.63	.56
21	.45	.65	.63	.08	.17	.58	.40	.13
22	.33	.79	1.00	0.0	.81	.71	.59	.41
23	.22	.67	.63	0.0	.10	.51	.32	.05
24	.35	.79	.67	0.0	.33	.60	.43	.17
25	0.0	1.00	.67	9.99	.85	.56	.	.
26	.50	.88	.73	9.99	.50	.70	.	.
27	.61	.75	.42	.25	.63	.59	.53	.44
28	.84	.64	.69	9.99	.75	.72	.	.
29	.44	.75	.63	9.99	.50	.61	.	.
30	1.00	.70	1.00	9.99	.61	.90	.	.
31	.25	.79	.63	.42	.73	.56	.56	.57
32	.25	.56	.65	.50	.72	.49	.54	.61
33	.63	.50	.67	.75	.56	.60	.62	.66
34	.50	.48	.65	.25	.81	.54	.54	.53
35	.45	.58	.70	.50	.35	.58	.52	.43
36	.56	.50	.62	.25	.46	.56	.48	.36
37	.83	.81	.79	9.99	.61	.81	.	.
38	.83	.88	.54	.75	.39	.75	.68	.57
39	.65	.65	.65	.50	.79	.65	.65	.65
40	.59	.79	.75	.38	.73	.71	.65	.55
41	.64	.58	.75	.56	.55	.66	.62	.56
42	.33	.38	.50	.75	.75	.40	.54	.75
43	.38	.46	.69	.45	.75	.51	.55	.60
44	.48	.50	.75	.50	.50	.58	.55	.50
45	.81	.77	.85	.38	.46	.81	.65	.42
46	1.00	.67	.80	.38	.80	.82	.73	.59
47	.67	.50	9.99	.75	.63	.	.	.69
48	.75	.50	9.99	.75	.88	.	.	.82
49	.70	.56	1.00	9.99	.38	.75	.	.
50	.77	.67	.67	9.99	.50	.70	.	.
51	.71	.56	.65	.44	.56	.64	.58	.50
52	.65	.50	1.00	.50	.63	.72	.66	.56
53	.75	.42	.50	.44	.79	.56	.58	.62
54	.92	.65	.67	.50	.75	.75	.70	.63
55	.82	.50	.83	.25	.70	.72	.62	.48
56	.92	1.00	.88	9.99	.83	.93	.	.
57	.52	.38	.50	.60	.38	.47	.48	.49
58	.70	.31	.44	.50	.56	.48	.50	.53
59	.57	.42	.94	.25	.63	.64	.56	.44
60	.81	.50	1.00	9.99	.75	.77	.	.
61	.69	.67	.92	.50	.67	.76	.69	.59
62	.83	.53	1.00	.25	.75	.79	.67	.50
63	.69	.67	.69	.25	.73	.68	.61	.49
64	.63	.75	.63	9.99	.83	.67	.	.

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Performance Variables (Continued)

Case#	N1	N2	N3	N4	N5	BGN	SYSN	FSN
1	.57	.57	.71	.29	.43	.62	.51	.36
2	.71	.71	.86	.29	.57	.76	.63	.43
3	.57	.29	.57	.43	.71	.48	.51	.57
4	.71	.29	.57	.29	.71	.52	.51	.50
5	.57	.71	.71	.14	.29	.67	.49	.21
6	.71	.71	.57	.29	.71	.67	.60	.50
7	.86	.71	.86	.29	.57	.81	.66	.43
8	.71	.57	.71	.29	.43	.67	.54	.36
9	.57	.29	.71	.43	.43	.52	.49	.43
10	.71	.71	.57	.29	.86	.67	.63	.57
11	.57	.57	1.00	.43	.43	.71	.60	.43
12	.43	.71	.71	.29	.71	.62	.57	.50
13	.57	.71	.57	.29	.86	.62	.60	.57
14	.43	.71	.71	.29	.86	.62	.60	.57
15	.57	.57	.71	.43	.86	.62	.63	.64
16	.71	.57	.57	.29	.43	.62	.51	.36
17	.86	.43	.86	.43	.43	.71	.60	.43
18	.57	.29	.57	.29	.43	.48	.43	.36
19	.71	.86	.86	.57	.29	.81	.66	.43
20	.86	.57	.57	.29	.29	.67	.51	.29
21	.71	.86	.86	.43	.43	.81	.66	.43
22	.43	.57	.43	.29	.57	.48	.46	.43
23	.43	.71	.86	.29	.71	.67	.60	.50
24	.71	.57	.57	.29	.43	.62	.51	.36
25	.29	.43	.86	.	.71	.52	.	.
26	.57	.57	.57	.	.29	.57	.	.
27	.57	.43	.86	.14	.57	.62	.51	.36
28	.29	.43	.57	.	.29	.43	.	.
29	.57	.43	.29	.	.86	.43	.	.
30	.14	.71	.14	.	.86	.33	.	.
31	.29	.86	.86	.43	.57	.67	.60	.50
32	.29	.43	.71	.29	.57	.48	.46	.43
33	.57	.57	.71	.29	.86	.62	.60	.57
34	.43	.71	.71	.14	.57	.62	.51	.36
35	.71	.71	.86	.14	.71	.76	.63	.43
36	.57	.29	.71	.14	.71	.52	.49	.43
37	.43	1.00	.86	.	.57	.76	.	.
38	.43	.57	.43	.29	.57	.48	.46	.43
39	.71	.71	.71	.14	.86	.71	.63	.50
40	.29	.57	.57	.14	.57	.48	.43	.36
41	.71	.43	1.00	.57	.71	.71	.69	.64
42	.57	.29	.29	.29	.29	.38	.34	.29
43	.86	.86	.57	.71	1.00	.76	.80	.86
44	.71	.43	.57	.29	.43	.57	.49	.36
45	.57	.57	.57	.29	.86	.57	.57	.57
46	.57	.71	.71	.29	.71	.67	.60	.50
47	.86	.71	.	.57	.57	.	.	.57
48	.57	.57	.	.29	.29	.	.	.29
49	.86	.57	.14	.	.29	.52	.	.
50	.71	.43	.43	.	.29	.52	.	.
51	.86	.57	.71	.57	.57	.71	.66	.57
52	.86	.29	.29	.29	.86	.48	.51	.57
53	.43	.43	.29	.57	.86	.38	.51	.71
54	.57	.71	.86	.29	.71	.71	.63	.50
55	.57	.29	.86	.14	1.00	.57	.57	.57
56	.57	.14	.57	.	.71	.43	.	.
57	.71	.57	.43	.71	.57	.57	.60	.64
58	.71	.57	.57	.29	.57	.62	.54	.43
59	.71	.43	.57	.14	.86	.57	.54	.50
60	.71	.29	.29	.	.43	.43	.	.
61	.57	1.00	.57	.14	.86	.71	.63	.50
62	.43	.	.14	.14	.43	.	.	.29
63	.57	.43	.57	.14	1.00	.52	.54	.57
64	.57	.	.71	.	.71	.	.	.

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Performance Variables (Continued)

Case#	NH1	NH2	NH3	NH4	NH5	BGNH	SYSNH	FSNH
1	.45	.46	.48	.29	.27	.46	.39	.28
2	.43	.39	.63	.29	.43	.49	.43	.36
3	.26	.18	.39	.03	.20	.28	.21	.12
4	.25	.18	.46	0.0	.48	.30	.27	.24
5	.27	.43	.30	.04	.03	.33	.21	.03
6	.21	.34	.27	.18	.29	.27	.26	.23
7	.54	.26	.68	.14	.29	.49	.38	.21
8	.52	.14	.71	.14	.19	.46	.34	.17
9	.32	.21	.51	.03	.32	.35	.28	.18
10	.50	.54	.44	0.0	.43	.49	.38	.21
11	.22	.39	.58	.18	.18	.40	.31	.18
12	.21	.49	.57	.14	.68	.42	.42	.41
13	.22	.61	.46	0.0	.37	.43	.33	.18
14	.18	.61	.57	0.0	.48	.45	.37	.24
15	.36	.46	.54	.03	.49	.45	.38	.26
16	.50	.57	.13	0.0	.12	.40	.27	.06
17	.28	.39	.46	.18	.07	.38	.28	.13
18	.36	.25	.43	.14	.14	.35	.26	.14
19	.27	.68	.63	.25	.04	.53	.37	.14
20	.36	.50	.42	.14	.18	.43	.32	.16
21	.32	.56	.54	.03	.07	.47	.31	.05
22	.14	.45	.43	0.0	.46	.34	.30	.23
23	.09	.48	.54	0.0	.07	.37	.24	.04
24	.25	.45	.38	0.0	.14	.36	.25	.07
25	0.0	.43	.57	.	.61	.33	.	.
26	.29	.50	.42	.	.14	.40	.	.
27	.35	.32	.36	.04	.36	.34	.29	.20
28	.24	.27	.39	.	.21	.30	.	.
29	.25	.32	.18	.	.43	.25	.	.
30	.14	.50	.14	.	.52	.26	.	.
31	.07	.68	.54	.18	.42	.43	.38	.30
32	.07	.24	.46	.14	.41	.26	.27	.28
33	.36	.29	.48	.21	.48	.37	.36	.35
34	.21	.34	.46	.04	.46	.34	.30	.25
35	.32	.41	.60	.07	.25	.45	.33	.16
36	.32	.14	.44	.04	.33	.30	.25	.18
37	.36	.81	.68	.	.35	.61	.	.
38	.36	.50	.23	.21	.22	.36	.31	.22
39	.46	.46	.46	.07	.68	.46	.43	.37
40	.17	.45	.43	.05	.42	.35	.30	.24
41	.46	.25	.75	.32	.39	.49	.43	.36
42	.19	.11	.14	.21	.21	.15	.17	.21
43	.33	.39	.39	.32	.75	.37	.44	.54
44	.34	.21	.43	.14	.21	.33	.27	.18
45	.46	.44	.49	.11	.39	.46	.38	.25
46	.57	.48	.57	.11	.57	.54	.46	.34
47	.57	.36	.	.43	.36	.	.	.39
48	.43	.29	.	.21	.25	.	.	.23
49	.60	.32	.14	.	.11	.35	.	.
50	.55	.29	.29	.	.14	.37	.	.
51	.61	.32	.46	.25	.32	.46	.39	.29
52	.56	.14	.29	.14	.54	.33	.33	.34
53	.32	.18	.14	.25	.68	.21	.31	.46
54	.53	.46	.57	.14	.54	.52	.45	.34
55	.47	.14	.71	.04	.70	.44	.41	.37
56	.53	.14	.50	.	.59	.39	.	.
57	.37	.22	.21	.43	.22	.27	.29	.32
58	.50	.18	.25	.14	.32	.31	.28	.23
59	.41	.18	.54	.04	.54	.37	.34	.29
60	.58	.14	.29	.	.32	.34	.	.
61	.39	.67	.53	.07	.57	.53	.45	.32
62	.36	.	.14	.04	.32	.	.	.18
63	.39	.29	.39	.04	.73	.36	.37	.38
64	.36	.	.45	.	.59	.	.	.

Number of cases read = 64 Number of cases listed = 64

Normalized Values

Strike Variables

Case#	D	TIMDEP	LATE
1	0.0	0.0	1.00
2	.13	.14	.76
3	.23	.12	.59
4	.05	0.0	1.00
5	.03	.20	1.00
6	.38	.52	.95
7	.13	.41	1.00
8	.38	.48	1.00
9	.28	.05	.48
10	.45	.67	.76
11	.25	.05	.85
12	.93	.76	1.00
13	.05	.05	.63
14	.41	.55	1.00
15	.15	.22	.94
16	.75	.61	1.00
17	.25	.60	1.00
18	.25	.63	1.00
19	.25	.47	.47
20	.25	.50	.70
21	.23	.50	.71
22	.19	.47	.47
23	.60	.33	.60
24	.10	.27	1.00
25	0.0	0.0	1.00
26	.48	.64	.50
27	.39	.42	.50
28	.15	.69	1.00
29	1.00	.41	.69
30	.13	.44	.75
31	0.0	0.0	1.00
32	.33	.31	.34
33	0.0	0.0	1.00
34	.10	.38	1.00
35	.30	.44	1.00
36	.46	.59	1.00
37	.35	.50	.50
38	.48	.78	1.00
39	.65	.45	.90
40	.03	.55	.65
41	.39	.72	1.00
42	.40	.47	.63
43	1.00	.71	1.00
44	.08	.78	1.00
45	.50	.56	1.00
46	.70	.56	1.00
47	.68	.67	1.00
48	.40	.94	1.00
49	.45	.50	1.00
50	.18	.28	1.00
51	.53	.44	1.00
52	0.0	0.0	1.00
53	.40	.32	.68
54	.23	.36	1.00
55	.70	.42	.58
56	.05	.89	1.00
57	.13	.20	.60
58	.98	.63	1.00
59	0.0	0.0	1.00
60	.76	1.00	1.00
61	.90	.17	.70
62	.28	.88	1.00
63	.73	.37	.95
64	.13	.30	1.00

Number of cases read = 64 Number of cases listed = 64

Normalized Values
EPU Losses Variables

Case#	EPU1	EPU2	EPU3	EPUN	BGEPU	EPUORG	ER	EPUT1	EPUT2	EPUT3	EPUNT	BGEPUT	EPUORGT	ERT
1	1.00	1.00	1.00	1.00	1.00	0.0	1.00	.	.	.	.	.	.	.
2	.82	.96	.71	1.00	.50	.03	0.0	1.00	1.00	1.00	1.00	1.00	0.0	1.00
3	1.00	1.00	.99	1.00	.99	0.0	.97	.82	.96	.71	1.00	.50	.03	0.0
4	.98	.99	1.00	1.00	.96	0.0	.83	1.00	1.00	.99	1.00	.99	0.0	.97
5	1.00	1.00	1.00	1.00	1.00	0.0	1.00	.98	.99	1.00	1.00	.96	0.0	.83
6	1.00	1.00	1.00	.96	.96	.15	.99	1.00	1.00	1.00	1.00	1.00	0.0	1.00
7	.99	1.00	1.00	1.00	.99	0.0	.94	1.00	1.00	1.00	.96	.96	.15	.99
8	.81	1.00	.99	1.00	.80	.23	.95	.99	1.00	1.00	1.00	.99	0.0	.94
9	1.00	1.00	1.00	1.00	1.00	.27	1.00	.81	1.00	.99	1.00	.80	.23	.95
10	1.00	1.00	1.00	1.00	1.00	.04	1.00	1.00	1.00	1.00	1.00	1.00	.27	1.00
11	.98	.99	1.00	.95	.92	0.0	.59	1.00	1.00	1.00	1.00	1.00	.04	1.00
12	.46	.99	.99	1.00	.44	.15	.78	.98	.99	1.00	.95	.92	0.0	.59
13	.99	1.00	1.00	1.00	.99	.02	.97	.46	.99	.99	1.00	.44	.15	.78
14	1.00	1.00	1.00	1.00	1.00	.11	1.00	.99	1.00	1.00	1.00	.99	.02	.97
15	.	.	.	.	.	.	.	1.00	1.00	1.00	1.00	1.00	.11	1.00
16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
17	.98	1.00	1.00	1.00	.98	.13	.99	.	.	.	.	.	.	.
18	.99	1.00	1.00	1.00	.99	.12	.99	.98	1.00	1.00	1.00	.98	.13	.99
19	1.00	1.00	1.00	1.00	1.00	.09	1.00	.99	1.00	1.00	1.00	.99	.12	.99
20	.99	.78	.77	.67	.20	.11	.58	1.00	1.00	1.00	1.00	1.00	.09	1.00
21	.95	.98	1.00	1.00	.93	.02	.83	.99	.78	.77	.67	.20	.11	.58
22	.93	1.00	1.00	1.00	.93	.26	.98	.95	.98	1.00	1.00	.93	.02	.83
23	1.00	1.00	1.00	1.00	1.00	.09	1.00	.93	1.00	1.00	1.00	.93	.26	.98
24	.60	.75	1.00	1.00	.36	.22	.83	1.00	1.00	1.00	1.00	1.00	.09	1.00
25	1.00	.99	1.00	1.00	.99	.22	1.00	.60	.75	1.00	1.00	.36	.22	.83
26	1.00	1.00	1.00	.97	.98	.07	.98	1.00	.99	1.00	1.00	.99	.22	1.00
27	.98	1.00	1.00	1.00	.98	0.0	.88	1.00	1.00	1.00	.97	.98	.07	.98
28	.99	1.00	1.00	1.00	.99	.05	.99	.98	1.00	1.00	1.00	.98	0.0	.88
29	1.00	1.00	1.00	1.00	1.00	0.0	1.00	.99	1.00	1.00	1.00	.99	.05	.99
30	.99	1.00	1.00	.94	.93	.48	.99	1.00	1.00	1.00	1.00	1.00	0.0	1.00
31	1.00	1.00	1.00	1.00	1.00	.06	1.00	.99	1.00	1.00	.94	.93	.48	.99
32	.94	.81	.94	.98	.66	.21	.91	1.00	1.00	1.00	1.00	1.00	.06	1.00
33	.	.	.	.	.	.	.	9.99	9.99	9.99	9.99	9.99	9.99	9.99
34	.	.	.	.	.	.	.	.	.	.	.	.	.	.
35	1.00	1.00	1.00	1.00	1.00	.01	1.00	.	.	.	.	.	.	.
36	1.00	1.00	1.00	1.00	1.00	.30	1.00	1.00	1.00	1.00	1.00	1.00	.01	1.00
37	1.00	1.00	1.00	1.00	1.00	0.0	1.00	1.00	1.00	1.00	1.00	1.00	.30	1.00
38	.33	1.00	1.00	1.00	.33	.09	.58	1.00	1.00	1.00	1.00	1.00	0.0	1.00
39	1.00	1.00	1.00	1.00	1.00	0.0	1.00	.33	1.00	1.00	1.00	.33	.09	.58
40	.94	1.00	1.00	1.00	.94	.02	.79	1.00	1.00	1.00	1.00	1.00	0.0	1.00
41	.98	1.00	1.00	.99	.96	.04	.94	.94	1.00	1.00	1.00	.94	.02	.79
42	1.00	1.00	1.00	1.00	1.00	.08	1.00	.98	1.00	1.00	.99	.96	.04	.94
43	1.00	1.00	1.00	1.00	1.00	.08	1.00	1.00	1.00	1.00	1.00	1.00	.08	1.00
44	1.00	1.00	1.00	1.00	1.00	.13	1.00	1.00	1.00	1.00	1.00	1.00	.08	1.00
45	1.00	1.00	1.00	1.00	1.00	.02	1.00	1.00	1.00	1.00	1.00	1.00	.13	1.00
46	.81	.88	1.00	1.00	.69	.50	.96	1.00	1.00	1.00	1.00	1.00	.02	1.00
47	1.00	1.00	1.00	1.00	1.00	.04	1.00	.81	.88	1.00	1.00	.69	.50	.96
48	.88	.71	1.00	.94	.52	.19	.86	1.00	1.00	1.00	1.00	1.00	.04	1.00
49	1.00	1.00	1.00	1.00	1.00	0.0	1.00	.88	.71	1.00	.94	.52	.19	.86
50	1.00	1.00	1.00	1.00	1.00	.19	1.00	1.00	1.00	1.00	1.00	1.00	0.0	1.00
51	1.00	1.00	1.00	1.00	1.00	.02	1.00	1.00	1.00	1.00	1.00	1.00	.19	1.00
52	.55	.94	1.00	1.00	.49	.18	.83	1.00	1.00	1.00	1.00	1.00	.02	1.00
53	1.00	1.00	1.00	1.00	1.00	.36	1.00	.55	.94	1.00	1.00	.49	.18	.83
54	.74	.26	1.00	1.00	0.0	.47	.88	1.00	1.00	1.00	1.00	1.00	.36	1.00
55	.99	1.00	.99	1.00	.98	0.0	.88	.74	.26	1.00	1.00	0.0	.47	.88
56	.99	1.00	.96	1.00	.95	.16	.98	.99	1.00	.99	1.00	.98	0.0	.88
57	1.00	1.00	1.00	1.00	1.00	.09	1.00	.99	1.00	.96	1.00	.95	.16	.98
58	1.00	1.00	1.00	1.00	1.00	.08	1.00	1.00	1.00	1.00	1.00	1.00	.09	1.00
59	1.00	1.00	1.00	1.00	1.00	0.0	1.00	1.00	1.00	1.00	1.00	1.00	.08	1.00
60	1.00	1.00	1.00	1.00	1.00	0.0	1.00	1.00	1.00	1.00	1.00	1.00	0.0	1.00
61	1.00	1.00	1.00	1.00	1.00	.02	1.00	1.00	1.00	1.00	1.00	1.00	0.0	1.00
62	.98	1.00	1.00	1.00	.98	.32	1.00	1.00	1.00	1.00	1.00	1.00	.02	1.00
63	1.00	1.00	1.00	1.00	1.00	.02	1.00	.98	1.00	1.00	1.00	.98	.32	1.00
64	.94	1.00	.81	1.00	.75	.13	.89	1.00	1.00	1.00	1.00	1.00	.02	1.00

Number of cases read = 64 Number of cases listed = 64

APPENDIX C. HEAT Scores

APPENDIX C. HEAT SCORES

Table C-I contains the summary HEAT analysis for all the nodes in the experimental trial for both groups. The performance average of the HEAT measures is $\bar{H}$ and the number of HEAT measures in the average is n. The rows are the sessions, i.e., A11.1 is Group A's first trial playing during the first half of day 1, B14.2 is Group B's first trial playing during the second half of day 4. Table C-II and C-III contain the HEAT scores determined from both the message traffic and observer notes for Groups A and B respectively. The seven HEAT measures are represented as follows:

RD	-	Received directive quality
SQ	-	Surprise queried
OO	-	ORANGE options understood
OI	-	ORANGE intent understood
CC	-	Contingency coverage
AI	-	Attempt to influence ORANGE
PR	-	BLUE predicts results

Tables C-IV and C-V contain the actual HEAT scores derived from the observer notes for Groups A and B respectively, and Tables C-VI and C-VII contain the HEAT scores derived from study of the message traffic for Groups A and B respectively.

Table C-I. Overall HEAT Scores

	C2F		STRIKE		CORAL		JFK		SARA	
	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n
A11.1	0.62	3	0.00	2	0.79	4	0.81	4	0.67	5
A11.2	0.75	4	0.00	2	0.60	5	0.55	5	0.74	6
A14.1	0.28	5	0.08	3	0.46	4	0.63	2	0.69	4
A14.2	0.67	5	0.00	2	0.35	5	0.63	2	0.81	4
A21.1	0.12	2	0.25	1	0.48	4	0.60	5	0.42	5
A21.2	0.40	5	0.63	2	0.30	5	0.47	5	0.48	4
A24.1	0.50	4	0.50	2	0.63	6	0.37	5	0.79	6
A24.2	0.44	3	0.50	2	0.73	5	0.25	4	1.00	5
A31.1	0.75	3	0.08	3	0.56	4	0.75	2	0.72	5
A31.2	0.50	6	0.00	2	0.70	5	0.75	5	0.77	4
A34.1	0.42	3	0.42	3	0.38	4	0.69	4	0.58	7
A34.2	0.95	5	0.50	2	0.50	3	0.68	5	0.80	5
A41.1	0.43	6	0.00	2	0.38	4	0.85	5	0.81	4
A41.2	0.56	6	0.00	2	0.42	3	0.85	5	0.80	5
A44.1	0.57	6	0.08	3	0.63	4	0.81	4	0.75	5
A44.2	0.29	3	0.00	2	0.70	5	1.00	4	0.23	4
A51.1	0.17	3	0.42	3	0.33	6	0.92	3	0.54	6
A51.2	0.33	3	0.50	2	0.63	4	0.88	2	0.75	4
A54.1	0.13	2	0.44	4	0.38	5	0.79	6	0.74	6
A54.2	0.63	2	0.50	2	0.42	6	0.88	4	0.73	4
A61.1	0.17	3	0.08	3	0.45	5	0.65	6	0.63	6
A61.2	0.81	4	0.00	2	0.33	3	0.79	4	1.00	3
A64.1	0.10	5	0.00	2	0.22	3	0.67	5	0.63	6
A64.2	0.33	3	0.00	2	0.35	5	0.79	4	0.67	4
A71.1	0.85	5	--	-	0.00	2	1.00	3	0.67	6
A71.2	0.50	2	--	-	0.50	4	0.88	4	0.73	4
A74.1	0.63	4	0.25	1	0.61	4	0.75	3	0.42	6
A74.2	0.75	2	--	-	0.84	2	0.64	3	0.69	4
A81.1	0.50	6	--	-	0.44	4	0.75	3	0.63	2
A81.2	0.61	6	--	-	1.00	1	0.70	5	1.00	1
A91.1	0.73	4	0.42	3	0.25	2	0.79	6	0.63	6
A91.2	0.72	4	0.50	2	0.25	2	0.56	3	0.65	5

	C2F		STR	
	$\bar{H}$	n	$\bar{H}$	
B11.1	0.56	6	0.75	
B11.2	0.81	4	0.25	
B14.1	0.35	5	0.50	
B14.2	0.46	5	0.25	
B21.1	0.61	4	--	
B21.2	0.39	4	0.75	
B24.1	0.79	6	0.50	
B24.2	0.73	4	0.38	
B31.1	0.55	5	0.56	
B31.2	0.75	2	0.75	
B34.1	0.75	7	0.45	
B34.2	0.50	3	0.50	
B41.1	0.46	6	0.38	
B41.2	0.80	5	0.38	
B44.1	0.63	4	0.75	
B44.2	0.88	2	0.75	
B51.1	0.38	2	--	
B51.2	0.50	2	--	
B54.1	0.56	4	0.44	
B54.2	0.63	6	0.50	
B61.1	0.79	6	0.44	
B61.2	0.75	5	0.50	
B64.1	0.70	7	0.25	
B64.2	0.83	5	--	
B71.1	0.38	4	0.60	
B71.2	0.56	4	0.50	
B74.1	0.63	6	0.25	
B74.2	0.75	3	--	
B84.1	0.67	6	0.50	
B84.2	0.75	3	0.25	
B94.1	0.73	7	0.25	
B94.2	0.83	5	--	

all HEAT Scores

	C2F		STRIKE		CORAL		JFK		SARA	
	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n	$\bar{H}$	n
B11.1	0.56	6	0.75	2	0.63	4	0.50	4	0.67	5
B11.2	0.81	4	0.25	1	0.50	3	0.48	5	0.65	5
B14.1	0.35	5	0.50	1	0.45	5	0.58	5	0.70	6
B14.2	0.46	5	0.25	1	0.56	4	0.50	2	0.62	5
B21.1	0.61	4	--	-	0.83	3	0.81	4	0.79	6
B21.2	0.39	4	0.75	2	0.83	3	0.88	4	0.54	3
B24.1	0.79	6	0.50	1	0.65	5	0.65	5	0.65	5
B24.2	0.73	4	0.38	1	0.59	2	0.79	4	0.75	4
B31.1	0.55	5	0.56	4	0.64	5	0.58	3	0.75	7
B31.2	0.75	2	0.75	2	0.33	4	0.38	2	0.50	2
B34.1	.75	7	0.45	5	0.38	6	0.46	6	0.69	4
B34.2	.50	3	0.50	2	0.48	5	0.50	3	0.75	4
B41.1	0.46	6	0.38	2	0.81	4	0.77	4	0.85	4
B41.2	0.80	5	0.38	2	1.00	4	0.67	5	0.80	5
B44.1	0.63	4	0.75	4	0.67	6	0.50	5	--	-
B44.2	0.88	2	0.75	2	0.75	4	0.50	4	--	-
B51.1	0.38	2	--	-	0.70	6	0.56	4	1.00	1
B51.2	0.50	2	--	-	0.77	5	0.67	3	0.67	3
B54.1	0.56	4	0.44	4	0.71	6	0.56	4	0.65	5
B54.2	0.63	6	0.50	2	0.65	6	0.50	2	1.00	2
B61.1	0.79	6	0.44	4	0.75	3	0.42	3	0.50	2
B61.2	0.75	5	0.50	2	0.92	4	0.65	5	0.67	6
B64.1	0.70	7	0.25	1	0.82	4	0.50	2	0.83	6
B64.2	0.83	5	--	-	0.92	4	1.00	1	0.88	4
B71.1	0.38	4	0.60	5	0.52	5	0.38	4	0.50	3
B71.2	0.56	4	0.50	2	0.70	5	0.31	4	0.44	4
B74.1	0.63	6	0.25	1	0.57	5	0.42	3	0.94	4
B74.2	0.75	3	--	-	0.81	5	0.50	2	1.00	2
B84.1	0.67	6	0.50	1	0.69	4	0.67	7	0.92	4
B84.2	0.75	3	0.25	1	0.83	3	0.53	4	1.00	1
B94.1	0.73	7	0.25	1	0.69	4	0.67	3	0.69	4
B94.2	0.83	5	--	-	0.63	4	0.75	4	0.63	5

Table C-II. All Source HEAT Score

	C2F							STRIKE							CORAL						
	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
A11.1	1.00	0.33	—	—	—	0.50	—	—	—	0.00	0.00	—	—	—	1.00	0.67	1.00	0.50	—	—	
A11.2	1.00	—	1.00	1.00	—	0.50	—	—	—	0.00	0.00	—	—	—	1.00	0.00	1.00	0.50	0.50	—	
A14.1	0.67	—	0.00	0.00	0.25	0.50	—	—	—	0.00	0.00	1.00	—	—	0.67	0.67	0.00	0.50	—	—	
A14.2	1.00	0.33	1.00	0.00	—	1.00	—	—	—	0.00	0.00	—	—	—	1.00	0.00	0.00	0.50	0.25	—	
A21.1	—	—	0.25	0.00	—	—	—	—	—	—	—	0.25	—	—	0.67	1.00	0.25	0.00	—	—	
A21.2	1.00	—	0.25	0.00	0.25	—	0.50	1.00	—	—	—	0.25	—	—	0.67	0.33	0.25	0.00	—	0.25	0.
A24.1	1.00	—	0.25	0.00	0.25	—	—	—	—	0.50	0.50	—	—	—	1.00	1.00	0.50	0.50	0.25	0.50	
A24.2	0.33	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—	1.00	0.67	0.50	0.50	—	1.00	
A31.1	1.00	—	1.00	—	0.25	—	—	—	—	0.00	0.00	0.25	—	—	1.00	—	0.50	0.00	0.75	—	
A31.2	1.00	1.00	0.00	0.25	0.25	0.50	—	—	—	0.00	0.00	—	—	—	1.00	1.00	0.50	0.50	0.50	—	
A34.1	—	—	0.50	0.50	0.25	—	—	—	—	0.50	0.50	0.25	—	—	1.00	—	0.00	0.00	0.50	—	
A34.2	1.00	1.00	1.00	1.00	0.75	—	—	—	—	0.50	0.50	—	—	—	—	—	0.00	1.00	—	—	0.
A41.1	1.00	0.33	0.00	0.00	0.25	—	1.00	—	—	0.00	0.00	—	—	—	1.00	—	0.25	0.00	0.25	—	
A41.2	1.00	0.67	0.00	0.75	0.50	—	0.50	—	—	0.00	0.00	—	—	—	—	—	0.25	0.00	1.00	—	
A44.1	1.00	0.67	0.00	0.50	0.25	—	1.00	—	—	0.00	0.00	0.25	—	—	—	1.00	0.50	0.50	0.50	—	
A44.2	—	0.33	0.00	0.50	—	—	—	—	—	0.00	0.00	—	—	—	—	1.00	0.50	1.00	0.50	—	
A51.1	—	—	0.25	0.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	0.67	0.33	0.50	0.25	0.00	—	0.
A51.2	—	—	0.50	0.00	—	—	0.50	—	—	0.50	0.50	—	—	—	0.67	0.33	0.50	1.00	—	—	
A54.1	—	—	0.25	0.00	—	—	—	—	1.00	0.00	0.50	0.25	—	—	0.33	0.33	0.50	0.25	0.20	—	
A54.2	—	—	0.25	1.00	—	—	—	—	—	0.00	1.00	—	—	—	0.33	0.67	0.50	0.25	0.25	—	0.
A61.1	—	—	0.25	0.00	—	—	0.25	—	—	0.00	0.00	0.25	—	—	1.00	1.00	0.00	0.00	0.25	—	
A61.2	1.00	—	0.75	1.00	—	—	0.50	—	—	0.00	0.00	—	—	—	1.00	—	0.00	0.00	—	—	
A64.1	0.00	0.00	0.25	0.00	0.25	—	—	—	—	0.00	0.00	—	—	—	—	0.67	0.00	0.00	—	—	
A64.2	—	—	0.25	0.50	0.25	—	—	—	—	0.00	0.00	—	—	—	1.00	—	0.00	0.00	0.25	—	0.
A71.1	1.00	1.00	1.00	1.00	0.25	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	—	—	
A71.2	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	1.00	0.00	0.00	—	—	
A74.1	—	—	0.50	0.50	0.50	—	1.00	—	—	—	—	0.50	—	—	0.67	1.00	0.75	0.00	—	—	
A74.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	0.67	1.00	0.75	0.00	—	—	
A81.1	1.00	1.00	0.00	0.00	0.50	0.50	—	—	—	—	—	—	—	—	1.00	—	0.50	0.00	0.25	—	
A81.2	1.00	0.67	0.00	1.00	—	0.50	0.50	—	—	—	—	—	—	—	0.00	—	0.50	0.00	—	—	
A91.1	1.00	0.67	—	0.50	0.75	—	—	—	—	0.50	0.50	0.25	—	—	—	—	—	—	—	—	
A91.2	1.00	0.67	—	1.00	0.20	—	—	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	

...ce HEAT Scores (Group A)

CORAL				JFK							SARA						
OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
0.50	—	—	—	1.00	1.00	1.00	—	—	—	—	0.67	0.67	1.00	1.00	0.50	—	—
0.50	0.50	—	—	0.67	0.33	0.75	0.50	—	0.50	—	1.00	0.67	0.75	0.75	0.25	1.00	—
0.50	—	—	—	1.00	—	—	—	0.25	—	—	1.00	—	1.00	0.50	0.25	—	—
0.50	0.25	—	—	—	1.00	—	—	0.25	—	—	1.00	—	1.00	1.00	0.25	—	—
0.00	—	—	—	0.33	0.67	0.75	1.00	0.25	—	—	—	0.33	0.50	0.50	0.25	—	0.50
0.00	—	0.25	0.00	0.00	0.33	0.75	1.00	0.25	—	—	0.67	—	0.50	0.50	0.25	—	—
0.50	0.25	0.50	—	1.00	0.33	0.00	0.00	0.50	—	—	1.00	—	1.00	1.00	0.25	1.00	0.50
0.50	—	1.00	—	0.67	0.33	0.00	0.00	—	—	—	1.00	1.00	1.00	1.00	1.00	—	—
0.00	0.75	—	—	—	—	—	—	—	—	—	1.00	0.33	1.00	0.75	0.50	—	—
0.50	0.50	—	—	—	1.00	1.00	1.00	0.25	0.50	—	1.00	0.33	1.00	0.75	—	—	—
0.00	0.50	—	—	—	1.00	1.00	0.50	0.25	—	—	1.00	0.33	0.75	0.75	0.25	0.50	0.50
1.00	—	—	0.50	0.67	1.00	1.00	0.50	0.25	—	—	1.00	1.00	0.75	0.75	0.50	—	—
0.00	0.25	—	—	1.00	1.00	1.00	1.00	0.25	—	—	1.00	—	1.00	1.00	0.25	—	—
0.00	1.00	—	—	1.00	1.00	1.00	1.00	0.25	—	—	1.00	1.00	0.50	1.00	0.50	—	—
0.50	0.50	—	—	1.00	—	1.00	1.00	0.25	—	—	1.00	—	0.75	1.00	0.50	—	0.50
1.00	0.50	—	—	1.00	1.00	1.00	1.00	—	—	—	0.67	—	0.00	0.00	0.25	—	—
0.25	0.00	—	0.25	1.00	—	0.75	1.00	—	—	—	1.00	—	0.50	0.50	0.25	0.50	0.50
1.00	—	—	—	—	—	0.75	1.00	—	—	—	1.00	1.00	0.50	0.50	—	—	—
0.25	0.20	—	—	1.00	1.00	1.00	1.00	0.25	—	0.50	1.00	0.67	0.75	0.50	0.25	—	0.25
0.25	0.25	—	0.50	1.00	—	1.00	1.00	0.50	—	—	0.67	1.00	0.75	0.50	—	—	—
0.00	0.25	—	—	0.67	1.00	0.75	0.75	0.25	—	0.50	—	1.00	0.50	0.50	0.25	—	0.50
0.00	—	—	—	1.00	0.67	0.75	0.75	—	—	—	1.00	1.00	—	1.00	—	—	—
0.00	—	—	—	1.00	0.33	0.75	0.75	—	—	0.50	1.00	1.00	0.50	0.50	0.25	—	0.50
0.00	0.25	—	0.50	0.67	1.00	0.75	0.75	—	—	—	1.00	0.67	0.50	0.50	—	—	—
0.00	—	—	—	1.00	—	1.00	1.00	—	—	—	1.00	1.00	0.75	0.50	0.25	—	0.50
0.00	—	—	—	1.00	—	1.00	1.00	0.50	—	—	1.00	0.67	0.75	0.50	—	—	—
0.00	—	—	—	1.00	1.00	—	—	0.25	—	—	0.67	0.33	0.50	0.25	0.25	—	0.50
0.00	—	—	—	1.00	0.67	—	—	0.25	—	—	1.00	1.00	0.50	0.25	0.25	—	0.50
0.00	0.25	—	—	—	1.00	0.75	0.50	—	—	—	1.00	—	—	—	0.25	—	—
0.00	—	—	—	1.00	1.00	0.75	0.50	0.25	—	—	1.00	—	—	—	—	—	—
—	—	—	—	1.00	1.00	1.00	1.00	0.25	—	0.50	1.00	1.00	0.50	0.50	0.25	—	0.50
—	—	—	—	0.67-	—	0.50	0.50	—	—	—	—	1.00	0.50	1.00	0.25	—	0.50

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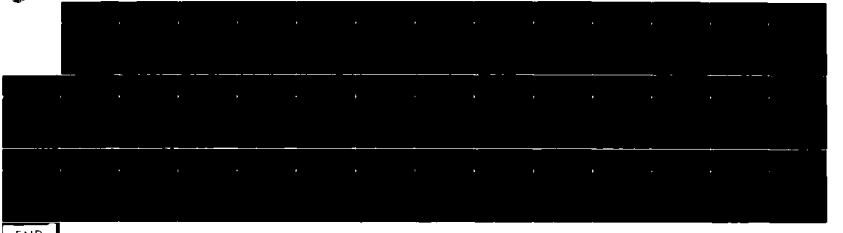

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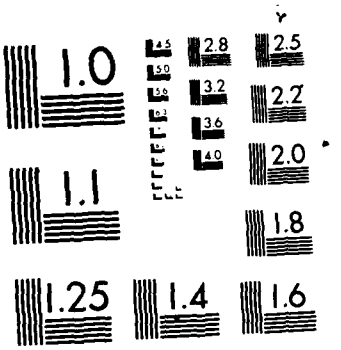

Table C-III. All Source HEAT

	C2F							STRIKE							CORAL					
	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI
B11.1	0.67	0.67	0.75	0.50	0.25	—	0.50	1.00	—	—	—	0.50	—	—	1.00	1.00	0.00	0.50	—	—
B11.2	1.00	1.00	0.75	0.50	—	—	—	—	—	—	—	0.25	—	—	1.00	—	0.00	0.50	—	—
B14.1	1.00	—	0.00	0.00	0.25	—	0.50	—	—	—	—	—	0.25	—	1.00	1.00	0.00	0.00	0.25	—
B14.2	0.67	1.00	0.00	0.37	0.25	—	—	—	—	—	—	0.25	—	—	1.00	1.00	0.00	0.25	—	—
B21.1	—	0.67	1.00	0.50	0.25	—	—	—	—	—	—	—	—	—	1.00	—	0.50	1.00	—	—
B21.2	—	0.67	0.50	0.25	0.125	—	—	—	—	—	1.00	—	0.50	—	—	1.00	0.50	1.00	—	—
B24.1	1.00	1.00	0.75	0.75	0.75	—	0.50	—	—	—	—	—	0.50	—	1.00	1.00	0.50	0.50	0.25	—
B24.2	1.00	0.67	0.75	0.50	—	—	—	—	—	—	0.50	0.25	—	—	—	0.67	0.50	—	—	—
B31.1	—	—	1.00	0.50	0.25	0.50	0.50	—	—	1.00	0.50	0.25	—	0.50	1.00	1.00	0.50	0.50	0.20	—
B31.2	—	—	1.00	0.50	—	—	—	—	—	1.00	0.50	—	—	—	0.00	0.33	0.50	0.50	—	—
B34.1	1.00	1.00	1.00	1.00	0.25	0.50	0.50	—	—	0.50	0.50	0.25	0.50	0.50	0.67	0.33	0.75	0.75	0.25	—
B34.2	—	—	0.75	0.00	0.25	—	—	—	—	0.50	0.50	—	—	—	0.00	0.67	0.50	0.75	—	—
B41.1	—	1.00	0.50	0.00	0.25	0.50	0.50	—	—	—	—	0.85	0.50	—	1.00	—	1.00	1.00	0.25	—
B42.2	1.00	1.00	0.75	1.00	0.25	—	—	—	—	—	—	0.25	0.50	—	1.00	1.00	1.00	1.00	—	—
B44.1	—	—	1.00	0.75	0.25	—	0.50	—	—	0.50	1.00	0.50	—	1.00	1.00	1.00	0.50	0.50	0.50	—
B44.2	—	—	1.00	0.75	—	—	—	—	—	0.50	1.00	—	—	—	1.00	1.00	0.50	0.50	—	—
B51.1	—	—	—	0.50	0.25	—	—	—	—	—	—	—	—	—	0.67	1.00	1.00	1.00	0.25	—
B51.2	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	0.33	1.00	1.00	—	—
B54.1	1.00	—	0.50	—	0.25	—	0.50	—	—	0.50	0.50	0.25	—	0.50	1.00	1.00	0.75	0.75	0.25	—
B54.2	1.00	1.00	0.50	0.50	0.25	—	0.50	—	—	0.50	0.50	—	—	—	1.00	0.67	0.75	0.75	0.25	—
B61.1	1.00	1.00	0.75	0.75	0.75	0.50	—	—	—	0.50	0.50	0.25	—	0.50	—	—	1.00	1.00	0.25	—
B61.2	1.00	1.00	0.75	0.75	0.25	—	—	—	—	0.50	0.50	—	—	—	1.00	0.67	1.00	1.00	—	—
B64.1	1.00	0.67	1.00	1.00	0.25	0.50	0.50	—	—	—	—	0.25	—	—	—	1.00	1.00	1.00	0.25	—
B64.2	1.00	0.67	1.00	1.00	—	—	0.50	—	—	—	—	—	—	—	0.67	1.00	1.00	1.00	—	—
B71.1	—	1.00	0.25	0.00	0.25	—	—	—	—	0.50	0.50	0.50	1.00	0.50	0.67	0.67	0.75	0.50	0.25	—
B71.2	—	1.00	0.50	0.50	0.25	—	—	—	—	0.50	0.50	—	—	—	—	1.00	0.75	0.50	0.75	—
B74.1	1.00	1.00	0.50	0.50	0.25	—	0.50	—	—	—	—	0.25	—	—	1.00	0.33	0.75	0.50	0.25	—
B74.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	1.00	1.00	0.75	0.50	—	—
B84.1	1.00	1.00	0.75	0.50	0.25	—	0.50	—	—	—	—	0.50	—	—	—	1.00	0.50	1.00	0.25	—
B84.2	—	1.00	0.75	0.50	—	—	—	—	—	—	—	0.25	—	—	—	1.00	0.50	1.00	—	—
B94.1	1.00	1.00	0.75	0.625	0.25	0.50	1.00	—	—	—	—	0.25	—	—	—	—	1.00	1.00	0.25	0.
B94.2	0.67	1.00	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	1.00	0.50	—	0.

All Source HEAT Scores (Group B)

CORAL					JFK							SARA						
OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
1.00	0.50	—	—	—	1.00	1.00	0.00	0.00	—	—	—	—	0.67	1.00	1.00	0.20	—	0.50
1.00	0.50	—	—	—	1.00	0.67	0.00	0.00	0.25	—	—	1.00	0.00	1.00	1.00	0.25	—	—
1.00	0.00	0.25	—	—	0.67	1.00	0.50	0.50	0.25	—	—	1.00	0.67	0.75	1.00	0.20	0.50	—
1.00	0.25	—	—	—	—	—	0.50	0.50	—	—	—	0.67	0.67	0.75	0.75	0.25	—	—
0.50	1.00	—	—	—	1.00	—	1.00	1.00	0.25	—	—	1.00	1.00	1.00	1.00	0.25	0.50	—
0.50	1.00	—	—	—	1.00	—	1.00	1.00	0.50	—	—	—	—	0.50	0.625	0.50	—	—
0.50	0.50	0.25	—	—	1.00	0.00	1.00	1.00	0.25	—	—	1.00	—	0.50	0.50	0.75	—	0.50
0.50	—	—	—	—	1.00	0.67	1.00	0.50	—	—	—	1.00	1.00	0.50	0.50	—	—	—
0.50	0.50	0.20	—	—	1.00	—	0.75	0.00	—	—	—	1.00	1.00	1.00	1.00	0.25	0.50	0.50
0.50	0.50	—	—	—	—	—	0.75	0.00	—	—	—	—	—	1.00	0.00	—	—	—
0.75	0.75	0.25	—	0.50	1.00	—	0.00	0.50	0.25	0.50	0.50	1.00	—	0.50	1.00	0.25	—	—
0.50	0.75	—	—	0.50	1.00	—	0.00	0.50	—	—	—	1.00	1.00	1.00	0.00	—	—	—
1.00	1.00	0.25	—	—	1.00	0.33	1.00	0.75	—	—	—	1.00	0.67	0.75	1.00	—	—	—
1.00	1.00	—	—	—	0.67	0.67	1.00	0.75	0.25	—	—	1.00	1.00	0.75	1.00	0.25	—	—
0.50	0.50	0.50	—	0.50	0.67	0.33	0.75	0.50	0.25	—	—	—	—	—	—	—	—	—
0.50	0.50	—	—	—	0.67	0.33	0.50	0.50	—	—	—	—	—	—	—	—	—	—
1.00	1.00	0.25	—	0.25	1.00	—	0.50	0.50	0.25	—	—	1.00	—	—	—	—	—	—
1.00	1.00	—	—	0.50	1.00	—	0.50	0.50	—	—	—	1.00	1.00	—	0.00	—	—	—
0.75	0.75	0.25	—	0.50	1.00	—	0.50	0.50	0.25	—	—	1.00	1.00	—	0.50	0.25	—	0.50
0.75	0.75	0.25	—	0.50	—	—	0.50	0.50	—	—	—	1.00	—	—	1.00	—	—	—
1.00	1.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	0.50	0.50	—	—	—
1.00	1.00	—	—	—	1.00	1.00	0.50	0.50	0.25	—	—	1.00	1.00	0.50	0.50	0.50	—	0.50
1.00	1.00	0.25	—	0.50	—	—	0.50	0.50	—	—	—	1.00	1.00	0.75	0.75	0.25	—	0.50
1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—	1.00	1.00	0.75	0.75	—	—	—
0.75	0.50	0.25	—	—	1.00	—	0.00	0.00	—	—	0.50	—	1.00	0.50	0.00	—	—	—
0.75	0.50	0.75	—	0.50	1.00	—	0.00	0.00	0.25	—	—	1.00	—	0.50	0.00	0.25	—	—
0.75	0.50	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	1.00	1.00	0.25	—	0.50
0.75	0.50	—	—	—	—	—	0.50	0.50	—	—	—	—	—	1.00	1.00	—	—	—
0.50	1.00	0.25	—	—	1.00	0.67	0.50	0.75	0.25	0.50	1.00	—	—	1.00	1.00	0.25	—	0.50
0.50	1.00	—	—	—	0.67	1.00	0.50	0.50	—	—	—	—	1.00	—	—	—	—	—
1.00	1.00	0.25	0.50	—	1.00	—	0.50	0.50	—	—	—	1.00	—	1.00	0.50	0.25	—	—
1.00	0.50	—	0.50	0.50	1.00	1.00	0.50	0.50	—	—	—	—	0.67	1.00	0.50	0.50	—	0.50

2

Table C-IV. Observer HEAT Score

	C2F							STRIKE							CORAL					
	RD	SQ	∞	OI	CC	AI	PR	RD	SQ	∞	OI	CC	AI	PR	RD	SQ	∞	OI	CC	AI
A11.1	1.00	1.00	—	—	—	0.50	—	—	—	—	—	—	—	—	1.00	0.67	1.00	0.50	—	—
A11.2	1.00	—	1.00	1.00	—	0.50	—	—	—	—	—	—	—	—	1.00	0.00	1.00	0.50	0.50	—
A14.1	0.67	—	—	—	—	0.50	—	—	—	—	—	—	—	—	0.67	0.67	—	1.00	—	—
A14.2	1.00	0.33	1.00	—	—	1.00	—	—	—	—	—	—	—	—	1.00	0.00	—	0.50	0.25	—
A21.1	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	0.67	1.00	0.50	—	—	—
A21.2	1.00	—	0.50	—	0.25	—	0.50	—	—	—	—	—	—	—	0.67	0.33	0.50	—	—	0.50
A24.1	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	0.00	—	—	0.50
A24.2	0.33	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	0.67	0.00	—	—	1.00
A31.1	1.00	—	1.00	—	0.25	—	—	—	—	—	—	—	—	—	1.00	—	1.00	—	0.75	—
A31.2	1.00	1.00	0.00	0.25	0.25	0.50	—	—	—	—	—	—	—	—	1.00	1.00	—	0.50	0.50	—
A34.1	—	—	1.00	1.00	0.25	—	—	—	—	—	—	—	—	—	1.00	—	—	—	0.50	—
A34.2	1.00	1.00	1.00	1.00	0.75	—	—	—	—	—	—	—	—	—	—	—	—	1.00	—	—
A41.1	1.00	0.33	—	—	—	—	1.00	—	—	—	—	—	—	—	1.00	—	0.50	—	0.25	—
A42.2	—	0.67	—	0.75	0.25	—	0.50	—	—	—	—	—	—	—	—	—	0.50	—	1.00	—
A44.1	1.00	0.67	—	1.00	0.25	—	1.00	—	—	—	—	—	—	—	—	—	—	—	0.50	—
A44.2	—	0.33	—	1.00	—	—	—	—	—	—	—	—	—	—	—	1.00	0.50	1.00	0.50	—
A51.1	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	0.67	0.33	0.50	0.50	0.00	—
A51.2	—	—	0.50	—	—	—	0.50	—	—	—	—	—	—	—	0.67	0.33	0.50	0.50	—	—
A54.1	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	0.33	0.33	0.50	0.50	0.20	—
A54.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	0.33	0.67	0.50	0.50	0.25	—
A61.1	—	—	0.50	—	—	—	0.50	—	—	—	—	—	—	—	1.00	—	—	—	0.25	—
A61.2	1.00	—	0.75	1.00	—	—	0.50	—	—	—	—	—	—	—	1.00	—	—	—	—	—
A64.1	—	—	0.50	—	0.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A64.2	—	—	0.50	0.50	0.25	—	—	—	—	—	—	—	—	—	1.00	—	—	—	0.25	—
A71.1	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A71.2	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—	—
A74.1	—	—	0.50	—	0.25	—	—	—	—	—	—	—	—	—	0.67	1.00	1.00	—	—	—
A74.2	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	0.67	1.00	1.00	—	—	—
A81.1	1.00	1.00	—	—	0.50	0.50	—	—	—	—	—	—	—	—	1.00	—	—	—	—	—
A81.2	1.00	0.67	—	1.00	—	0.50	0.50	—	—	—	—	—	—	—	1.00	—	—	—	—	—
A91.1	1.00	0.67	—	0.50	0.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
A91.2	1.00	0.67	—	1.00	0.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Observer HEAT Scores (Group A)

CORAL						JFK							SARA						
SQ	CO	OI	CC	AI	PR	RD	SQ	CO	OI	CC	AI	PR	RD	SQ	CO	OI	CC	AI	PR
0.67	1.00	0.50	—	—	—	1.00	1.00	1.00	—	—	—	—	0.67	0.67	1.00	1.00	0.50	—	—
0.00	1.00	0.50	0.50	—	—	0.67	0.33	1.00	—	—	0.50	—	1.00	0.67	1.00	1.00	0.25	1.00	—
0.67	—	1.00	—	—	—	1.00	—	—	—	0.25	—	—	1.00	—	—	—	0.25	—	—
0.00	—	0.50	0.25	—	—	—	1.00	—	—	0.25	—	—	1.00	—	—	1.00	0.25	—	—
1.00	0.50	—	—	—	—	0.33	0.67	1.00	1.00	0.00	—	—	—	0.33	0.50	—	—	—	—
0.33	0.50	—	—	0.50	—	0.00	0.33	1.00	1.00	0.25	—	—	—	—	0.50	—	0.25	—	—
1.00	0.00	—	—	0.50	—	1.00	0.33	0.00	0.00	1.00	—	—	1.00	—	—	—	—	1.00	—
0.67	0.00	—	—	1.00	—	0.67	0.33	0.00	0.00	—	—	—	1.00	1.00	—	—	1.00	—	—
—	1.00	—	0.75	—	—	—	—	—	—	—	—	—	1.00	0.33	1.00	1.00	0.50	—	—
1.00	—	0.50	0.50	—	—	—	0.67	—	1.00	0.25	0.50	—	1.00	0.33	1.00	1.00	—	—	—
—	—	—	0.50	—	—	—	1.00	—	—	0.25	—	—	1.00	0.33	1.00	1.00	0.25	—	0.50
—	—	1.00	—	—	0.50	0.67	1.00	—	—	0.25	—	—	1.00	1.00	1.00	1.00	0.50	—	—
—	0.50	—	0.25	—	—	1.00	1.00	1.00	—	—	—	—	1.00	—	—	—	0.25	—	—
—	0.50	—	1.00	—	—	1.00	1.00	1.00	—	0.25	—	—	1.00	1.00	0.50	—	0.50	—	—
—	—	—	0.50	—	—	1.00	—	—	—	0.25	—	—	1.00	—	0.50	—	0.25	—	0.50
1.00	0.50	1.00	0.50	—	—	1.00	1.00	—	—	—	—	—	0.67	—	0.00	0.00	0.25	—	—
0.33	0.50	0.50	0.00	—	0.50	1.00	—	0.50	—	—	—	—	1.00	—	—	—	—	—	—
0.33	0.50	0.50	—	—	—	—	—	0.50	—	—	—	—	1.00	1.00	—	—	—	—	—
0.33	0.50	0.50	0.20	—	—	1.00	1.00	—	—	0.25	—	—	1.00	—	1.00	—	—	—	—
0.67	0.50	0.50	0.25	—	0.50	1.00	—	—	—	0.50	—	—	0.67	1.00	1.00	—	—	—	—
—	—	—	0.25	—	—	0.67	1.00	0.50	0.50	0.25	—	—	—	1.00	—	—	—	—	—
—	—	—	—	—	—	1.00	0.67	0.50	0.50	—	—	—	1.00	1.00	—	—	—	—	—
—	—	—	—	—	—	1.00	0.33	0.50	0.50	—	—	—	1.00	1.00	—	—	—	—	—
—	—	—	0.25	—	0.50	0.67	1.00	0.50	0.50	—	—	—	1.00	0.67	—	—	—	—	—
—	—	—	—	—	—	1.00	—	—	—	—	—	—	1.00	1.00	0.50	0.50	—	—	—
1.00	—	—	—	—	—	1.00	—	—	—	0.50	—	—	1.00	0.67	0.50	0.50	—	—	—
1.00	1.00	—	—	—	—	1.00	1.00	—	—	0.25	—	—	0.67	0.33	0.50	0.50	0.25	—	—
1.00	1.00	—	—	—	—	1.00	—	—	—	0.25	—	—	1.00	1.00	0.50	0.50	0.25	—	0.50
—	—	—	—	—	—	—	1.00	1.00	1.00	—	—	—	1.00	—	—	—	0.25	—	—
—	—	—	—	—	—	1.00	1.00	—	—	0.25	—	—	1.00	—	—	—	—	—	—
—	—	—	—	—	—	1.00	1.00	—	—	0.25	—	—	1.00	1.00	—	—	—	—	—
—	—	—	—	—	—	0.67	—	0.50	0.50	—	—	—	—	—	—	1.00	0.25	—	—

2

Table C-V. Observer HEAT Score

	C2F							STRIKE							CORAL					
	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI
B11.1	0.67	0.67	1.00	—	—	—	—	—	—	—	—	—	—	—	1.00	—	—	—	—	—
B11.2	1.00	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B14.1	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—	—
B14.2	1.00	1.00	—	0.50	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	0.50	—	—
B21.1	—	0.67	—	—	—	—	—	—	—	—	—	—	—	—	1.00	—	—	—	—	—
B21.2	—	0.67	0.50	0.00	0.00	—	—	—	—	—	—	—	—	—	—	1.00	—	—	—	—
B24.1	1.00	1.00	0.50	0.50	0.75	—	0.50	—	—	—	—	—	—	—	1.00	1.00	—	—	—	—
B24.2	1.00	0.67	0.50	0.50	—	—	—	—	—	—	—	—	—	—	—	0.67	0.50	—	—	—
B31.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	0.50	0.50	0.20	—
B31.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.33	0.50	0.50	—	—
B34.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.67	0.33	0.50	1.00	0.25	—
B34.2	—	—	0.50	—	0.25	—	—	—	—	—	—	—	—	—	0.00	0.67	0.50	1.00	—	—
B41.1	—	—	—	—	0.25	—	—	—	—	—	—	—	—	—	1.00	—	1.00	1.00	—	—
B42.2	—	—	1.00	1.00	—	—	—	—	—	—	—	—	—	—	1.00	1.00	1.00	1.00	—	—
B44.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	0.50	—
B44.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—	—
B51.1	—	—	—	0.50	—	—	—	—	—	—	—	—	—	—	1.00	—	1.00	1.00	0.25	—
B51.2	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	0.33	1.00	1.00	—	—
B54.1	—	—	0.50	—	0.25	—	0.50	—	—	—	—	—	—	—	1.00	1.00	0.50	0.50	0.25	—
B54.2	—	1.00	0.50	0.50	—	—	—	—	—	—	—	—	—	—	1.00	0.67	—	—	0.25	—
B61.1	1.00	1.00	1.00	0.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B61.2	1.00	1.00	1.00	0.50	—	—	—	—	—	—	—	—	—	—	1.00	0.67	—	—	—	—
B64.1	1.00	0.67	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	1.00	—	—	—
B64.2	1.00	0.67	1.00	1.00	—	—	0.50	—	—	—	—	—	—	—	0.67	1.00	—	1.00	—	—
B71.1	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—	0.67	0.67	1.00	0.50	0.25	—
B71.2	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	0.50	0.25	—
B74.1	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—	1.00	0.33	1.00	1.00	—	—
B74.2	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—	1.00	1.00	1.00	1.00	—	—
B84.1	1.00	1.00	0.50	0.50	—	—	0.50	—	—	—	—	—	—	—	—	1.00	0.50	—	0.25	—
B84.2	1.00	1.00	0.50	0.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B94.1	1.00	1.00	1.00	1.00	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	—	0.50
B94.2	0.67	1.00	1.00	1.00	—	—	0.50	—	—	—	—	—	—	—	—	—	—	0.50	—	0.50

Observer HEAT Scores (Group B)

CORAL						JFK							SARA						
SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
—	—	—	—	—	—	1.00	1.00	1.00	—	—	—	—	—	0.67	1.00	1.00	0.20	—	0.50
—	—	—	—	—	—	1.00	0.67	—	—	—	—	—	1.00	0.00	1.00	1.00	0.25	—	—
.00	—	—	—	—	—	0.67	1.00	—	—	0.25	—	—	1.00	0.67	0.50	1.00	0.20	—	—
.00	—	0.50	—	—	—	—	—	—	0.50	—	—	—	0.67	0.67	—	—	0.25	—	—
—	—	—	—	—	—	1.00	—	—	—	0.25	—	—	1.00	1.00	—	—	—	—	—
.00	—	—	—	—	—	1.00	—	—	—	0.50	—	—	—	—	0.50	0.50	0.25	—	—
.00	—	—	—	—	—	1.00	—	—	—	—	—	—	1.00	—	0.50	—	0.75	—	0.50
.67	0.50	—	—	—	—	1.00	0.67	—	0.00	—	—	—	1.00	1.00	—	—	—	—	—
.00	0.50	0.50	0.20	—	—	1.00	—	1.00	—	—	—	—	1.00	—	—	—	—	—	—
.33	0.50	0.50	—	—	—	—	—	1.00	—	—	—	—	—	—	—	—	—	—	—
.33	0.50	1.00	0.25	—	—	1.00	—	—	1.00	0.25	0.50	0.50	1.00	—	—	—	—	—	—
.67	0.50	1.00	—	—	0.50	1.00	—	—	1.00	—	—	—	1.00	1.00	1.00	0.00	—	—	—
—	1.00	1.00	—	—	—	1.00	0.33	1.00	0.50	—	—	—	1.00	0.67	0.50	—	—	—	—
.00	1.00	1.00	—	—	—	0.67	0.67	1.00	0.50	0.25	—	—	1.00	1.00	—	—	0.25	—	—
.00	—	—	0.50	—	—	0.67	0.33	1.00	0.50	—	—	—	—	—	—	—	—	—	—
.00	—	—	—	—		0.67	0.33	—	—	—	—	—	—	—	—	—	—	—	—
—	1.00	1.00	0.25	—	0.50	1.00	—	0.50	—	0.25	—	—	1.00	—	—	—	—	—	—
.33	1.00	1.00	—	—	0.50	1.00	—	0.50	—	—	—	—	1.00	1.00	—	0.00	—	—	—
.00	0.50	0.50	0.25	—	0.50	1.00	—	—	—	—	—	—	1.00	1.00	—	—	0.25	—	—
.67	—	—	0.25	—	0.50	—	—	1.00	—	—	—	—	1.00	—	—	1.00	—	—	—
—	—	—	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
.67	—	—	—	—	—	1.00	—	—	—	0.25	—	—	1.00	1.00	—	—	0.50	—	0.50
—	1.00	—	—	—	0.50	—	—	—	—	—	—	—	1.00	1.00	1.00	1.00	0.25	—	0.50
.00	—	1.00	—	—	—	—	—	—	—	—	—	—	1.00	1.00	1.00	1.00	—	—	—
.67	1.00	0.50	0.25	—	—	1.00	—	—	—	—	—	0.50	—	1.00	0.50	—	—	—	—
.00	1.00	0.50	0.25	—	0.50	1.00	—	—	—	0.25	—	—	1.00	—	0.50	—	0.25	—	—
.33	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
.00	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
.00	0.50	—	0.25	—	—	1.00	0.67	0.50	1.00	—	—	1.00	—	—	—	—	—	—	—
—	—	—	—	—	—	0.67	1.00	0.50	1.00	—	—	—	—	—	—	—	—	—	—
—	—	—	—	0.50	—	1.00	—	—	—	—	—	—	1.00	—	1.00	1.00	0.25	—	—
—	—	0.50	—	0.50	0.50	1.00	1.00	—	—	—	—	—	—	0.67	1.00	1.00	0.50	—	0.50

Table C-VI. Traffic HEAT Scores

	C2F							STRIKE							CORAL						
	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
A11.1	—	—	—	—	—	—	—	—	—	0.00	0.00	—	—	—	—	—	—	—	—	—	—
A11.2	—	—	0.50	0.50	—	—	—	—	—	0.00	0.00	—	—	—	—	—	—	—	—	—	—
A14.1	—	—	0.00	0.00	0.25	—	—	—	—	0.00	0.00	0.25	—	—	—	—	0.00	0.00	—	—	—
A14.2	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A21.1	—	—	0.00	0.00	—	—	—	—	—	—	—	0.25	—	—	—	—	0.00	0.00	—	—	—
A21.2	1.00	—	0.00	0.00	0.25	—	—	1.00	—	—	—	0.25	—	—	—	—	0.00	0.00	—	—	—
A24.1	1.00	—	0.00	0.00	0.25	—	—	—	—	0.50	0.50	—	—	—	—	0.67	0.50	0.50	0.25	—	—
A24.2	1.00	—	0.00	0.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
A31.1	—	—	—	—	—	—	—	—	—	0.00	0.00	0.25	—	—	—	—	0.00	0.00	0.25	—	—
A31.2	—	—	—	—	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A34.1	—	—	0.00	0.00	—	—	—	—	—	0.50	0.50	0.25	—	—	—	—	0.00	0.00	—	—	—
A34.2	—	—	0.00	0.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	0.00	0.00	—	—	—
A41.1	—	—	0.00	0.00	0.25	—	0.50	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A42.2	1.00	—	0.00	0.00	0.25	—	0.25	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A44.1	—	—	0.00	0.00	0.25	—	0.50	—	—	0.00	0.00	0.25	—	—	—	1.00	0.50	0.50	0.25	—	—
A44.2	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—	—	1.00	0.50	1.00	—	—	0.5
A51.1	—	—	0.00	0.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	1.00	0.50	0.00	—	—	—
A51.2	—	—	0.00	0.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	—	1.00	—	—	—
A54.1	—	—	0.00	0.00	—	—	—	—	1.00	0.00	0.50	0.25	—	—	—	—	0.50	0.00	—	—	—
A54.2	—	—	0.00	0.00	—	—	—	—	—	0.00	1.00	—	—	—	—	1.00	0.50	0.00	—	—	—
A61.1	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	0.25	—	—	—	1.00	0.00	0.00	—	—	—
A61.2	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A64.1	1.00	1.00	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—	—	0.67	0.00	0.00	—	—	—
A64.2	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.00	0.00	—	—	—
A71.1	—	—	1.00	1.00	0.25	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	—	—	—
A71.2	—	—	1.00	1.00	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	—	—	—
A74.1	—	—	0.50	0.50	0.50	—	1.0	—	—	—	—	0.25	—	—	—	0.67	0.50	0.00	—	—	—
A74.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	—	0.67	0.50	0.00	—	—	—
A81.1	—	—	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	0.50	0.00	0.25	—	—
A81.2	—	—	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	0.50	0.00	—	—	—
A91.1	—	—	—	—	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	0.50	0.00	—	—	—
A91.2	—	—	—	—	—	—	—	—	—	0.50	0.50	—	—	—	—	—	0.50	0.00	—	—	—

raffic HEAT Scores (Group A)

CORAL					JFK							SARA						
OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
—	—	—	—	—	—	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
—	—	—	—	—	—	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	1.00	0.50	0.25	—	—
0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	1.00	0.50	—	—	—
0.00	0.00	—	—	—	—	0.67	0.50	1.00	0.25	—	—	—	0.67	0.50	0.50	0.25	—	0.50
0.00	0.00	—	—	—	—	—	0.50	1.00	—	—	—	0.67	—	0.50	0.50	0.25	—	—
0.50	0.50	0.25	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	0.50
0.50	0.50	—	—	—	—	—	—	—	—	—	—	—	—	0.50	0.50	—	—	0.50
0.00	0.00	0.25	—	—	—	—	1.00	0.50	—	—	—	—	—	1.00	0.50	0.25	—	—
0.00	0.00	—	—	—	—	—	1.00	0.50	—	—	—	—	—	1.00	0.50	—	—	—
0.00	0.00	—	—	—	—	—	1.00	0.50	—	—	—	—	—	0.50	0.50	0.25	0.50	0.50
0.00	0.00	—	—	—	—	—	1.00	0.50	—	—	—	—	—	0.50	0.50	—	—	—
0.00	0.00	—	—	—	0.00	0.00	1.00	1.00	0.25	—	—	—	—	1.00	1.00	0.25	—	—
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	1.00	1.00	—	—	—
0.50	0.50	0.25	—	—	—	—	1.00	1.00	0.25	—	—	—	—	1.00	1.00	0.25	—	—
0.50	1.00	—	—	0.50	—	—	1.00	1.00	—	—	—	—	—	1.00	1.00	—	—	—
0.50	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	0.50	0.50	0.25	0.50	0.50
—	1.00	—	—	—	—	—	1.00	1.00	—	—	—	—	1.00	0.50	0.50	—	—	—
0.50	0.00	—	—	—	—	—	1.00	1.00	0.25	—	0.50	—	0.67	0.50	0.50	0.25	—	0.50
0.50	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—
0.00	0.00	—	—	—	—	—	1.00	1.00	0.25	—	0.50	—	—	0.50	0.50	0.25	—	0.50
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	0.50	1.00	—	—	—
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	0.50	—	—	0.50	0.50	0.25	—	0.50
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	1.00	0.50	0.50	—	—	—
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	1.00	0.50	0.25	—	0.50
0.00	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	1.00	0.50	—	—	—
0.50	0.00	—	—	—	—	—	—	—	—	—	—	—	—	0.50	0.00	0.25	—	0.50
0.50	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0.50	0.00	0.25	—	—	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—
0.50	0.00	—	—	—	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—
0.50	0.00	—	—	—	—	—	1.00	1.00	0.25	—	0.50	—	—	0.50	0.50	0.25	—	0.50
0.50	0.00	—	—	—	—	—	1.00	1.00	—	—	—	—	1.00	—	—	0.25	—	—

Table C-VII. Traffic HEAT Scores

	C2F							STRIKE							CORAL						
	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
B11.1	0.67	0.67	0.50	0.50	0.25	—	0.50	1.00	—	—	—	0.50	—	—	—	1.00	0.00	0.50	—	—	—
B11.2	1.00	1.00	0.50	0.50	—	—	—	—	—	—	—	0.25	—	—	1.00	—	0.00	0.50	0.25	—	—
B14.1	1.00	—	0.00	0.00	0.25	—	0.50	—	—	—	—	—	0.50	—	—	—	0.00	0.00	0.25	—	—
B14.2	0.67	—	—	0.25	0.25	—	—	—	—	—	—	0.25	—	—	—	—	0.00	0.00	0.00	0.00	0.0
B21.1	—	—	1.00	0.50	0.25	—	—	—	—	—	—	—	—	—	—	—	0.50	1.00	—	—	—
B21.2	—	—	0.50	0.50	0.25	—	—	—	—	—	1.00	—	0.50	—	—	—	0.50	1.00	—	—	—
B24.1	1.00	—	1.00	1.00	0.25	—	0.50	—	—	—	—	—	0.50	—	—	—	0.50	0.50	0.25	—	—
B24.2	—	—	1.00	0.50	—	—	—	—	—	—	0.50	0.25	—	—	—	—	0.50	0.50	—	—	—
B31.1	—	—	1.00	0.50	0.25	0.50	0.50	—	—	1.00	0.50	0.25	—	0.50	—	—	0.50	0.50	0.25	—	0.5
B31.2	—	—	1.00	0.50	—	—	—	—	—	1.00	0.50	—	—	—	—	—	0.50	0.50	—	—	—
B34.1	1.00	1.00	1.00	1.00	0.25	0.50	0.50	—	—	0.50	0.50	0.25	0.50	0.50	—	—	1.00	1.00	0.25	—	0.5
B34.2	—	—	1.00	0.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	1.00	1.00	—	—	—
B41.1	—	1.00	0.50	0.00	0.25	0.50	0.50	—	—	—	—	0.25	0.50	—	—	—	1.00	1.00	0.25	—	—
B42.2	1.00	1.00	0.50	1.00	0.25	—	—	—	—	—	—	0.25	0.50	—	—	—	1.00	1.00	—	—	—
B44.1	—	—	1.00	0.75	0.25	—	0.50	—	—	0.50	1.00	0.50	—	1.00	—	1.00	0.50	0.50	—	—	0.5
B44.2	—	—	1.00	1.00	—	—	—	—	—	0.50	1.00	—	—	—	—	—	0.50	0.50	—	—	—
B51.1	—	—	—	—	0.25	—	—	—	—	—	—	—	—	—	—	1.00	1.00	1.00	0.25	—	—
B51.2	—	—	—	0.50	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—
B54.1	1.00	—	—	—	—	—	—	—	—	0.50	0.50	0.25	—	0.50	—	—	1.00	1.00	0.25	—	—
B54.2	1.00	1.00	—	0.50	0.25	—	0.50	—	—	0.50	0.50	—	—	—	—	—	1.00	1.00	—	—	—
B61.1	0.67	1.00	0.50	1.00	0.75	0.50	—	—	—	0.50	0.50	0.25	—	0.50	—	—	1.00	1.00	0.25	—	—
B61.2	1.00	1.00	0.50	1.00	0.25	—	—	—	—	0.50	0.50	—	—	—	—	—	1.00	1.00	—	—	—
B64.1	—	0.67	1.00	0.50	0.25	0.50	0.50	—	—	—	—	0.25	—	—	—	1.00	1.00	1.00	0.25	—	—
B64.2	1.00	1.00	1.00	0.50	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—
B71.1	—	1.00	0.00	0.00	0.25	—	—	—	—	0.50	0.00	0.50	1.00	0.50	—	—	0.50	0.50	—	—	—
B71.2	—	1.00	0.50	0.00	0.25	—	—	—	—	0.50	0.00	—	—	—	—	—	0.50	0.50	—	—	—
B74.1	1.00	1.00	0.50	0.50	0.25	—	0.50	—	—	—	—	0.25	—	—	1.00	1.00	0.50	0.00	0.25	—	—
B74.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	—	—	0.50	0.00	—	—	—
B84.1	—	1.00	1.00	0.50	0.25	—	—	—	—	—	—	0.50	—	—	—	—	0.50	1.00	0.25	—	—
B84.2	—	1.00	1.00	0.50	—	—	—	—	—	—	—	0.25	—	—	—	1.00	0.50	1.00	—	—	—
B94.1	—	—	0.50	0.25	0.25	0.50	0.50	—	—	—	—	0.25	—	—	—	—	1.00	1.00	0.25	0.50	—
B94.2	—	—	0.50	1.00	—	—	—	—	—	—	—	—	—	—	—	—	1.00	1.00	—	—	—

HEAT Scores (Group B)

CORAL					JFK							SARA						
OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR	RD	SQ	OO	OI	CC	AI	PR
0.00	0.50	--	—	—	—	—	0.00	0.00	—	—	—	—	—	1.00	1.00	0.25	—	—
0.00	0.50	0.25	—	—	1.00	—	0.00	0.00	0.25	—	—	1.00	—	1.00	1.00	—	—	—
0.00	0.00	0.25	—	—	1.00	—	0.50	0.50	—	—	—	—	—	1.00	1.00	0.25	0.50	—
0.00	0.00	0.00	0.00	0.00	—	—	0.50	0.50	—	—	—	—	—	1.00	0.50	0.25	—	—
0.50	1.00	—	—	—	—	—	1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—
0.50	1.00	—	—	—	1.00	—	1.00	1.00	—	—	—	1.00	—	0.50	0.50	—	—	—
0.50	0.50	0.25	—	—	—	—	1.00	1.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—
0.50	0.50	—	—	—	—	—	—	0.50	—	—	—	—	—	0.50	0.50	—	—	—
0.50	0.50	0.25	—	0.50	—	—	0.50	0.50	—	—	—	1.00	—	—	—	—	—	—
0.50	0.50	—	—	—	—	—	0.50	0.00	—	—	—	—	—	—	—	—	—	—
1.00	1.00	0.25	—	0.50	—	—	0.00	0.00	0.25	0.50	0.50	—	—	0.50	0.00	0.25	—	—
1.00	1.00	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.50	0.00	—	—	—
1.00	1.00	0.25	—	—	—	—	1.00	1.00	—	—	—	—	—	1.00	1.00	—	—	—
1.00	1.00	—	—	—	—	1.00	1.00	1.00	—	—	—	—	—	1.00	1.00	—	—	—
0.50	0.50	—	—	0.50	—	1.00	0.50	0.50	0.25	—	—	—	—	—	—	—	—	—
0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—
1.00	1.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	—	—	—	—	—
1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	—	—	—	—	—
1.00	1.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	1.00	—	—	0.50	0.25	—	0.50
1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	—	0.50	—	—	—
1.00	1.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	0.50	0.50	—	—	—
1.00	1.00	—	—	—	1.00	1.00	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
1.00	1.00	0.25	—	—	—	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
1.00	1.00	—	—	—	1.00	—	0.50	0.50	—	—	—	—	—	0.50	0.50	—	—	—
0.50	0.50	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.50	0.00	—	—	—
0.50	0.50	—	—	—	—	—	0.00	0.00	—	—	—	—	—	0.50	0.00	—	—	—
0.50	0.00	0.25	—	—	—	—	0.50	0.50	0.25	—	—	—	—	1.00	1.00	0.25	—	0.50
0.50	0.00	—	—	—	—	—	0.50	0.50	—	—	—	—	—	1.00	1.00	—	—	—
0.50	1.00	0.25	—	—	—	—	0.50	0.50	0.25	0.50	—	—	—	1.00	1.00	0.25	—	0.50
0.50	1.00	—	—	—	—	1.00	0.50	0.50	—	—	—	—	1.00	1.00	1.00	—	—	—
1.00	1.00	0.25	0.50	—	—	—	0.50	0.50	—	—	—	—	—	1.00	0.50	—	—	—
1.00	1.00	—	—	—	—	—	0.50	0.50	—	—	—	—	1.00	1.00	0.50	—	—	0.50

APPENDIX D. Causal Influence Estimates

27 August 1986

APPENDIX D. CAUSAL INFLUENCE ESTIMATES

This appendix provides the causal influence estimates generated as a result of the experiment runs. Figure D-I displays a causal influence matrix for the reactive group (Group A); Figure D-II is a causal influence matrix for the proactive group (Group B). Tables D-I and D-II present a summary of the causal influences for Groups A and B respectively.

This appendix also presents the ordinary least-squares estimates of causal influence at both the system-level and node level on pages D-11 to D-29. Each estimate is presented thrice: overall, reactive (Group A), and proactive (Group B). The key to the variable names in the equations is provided in Appendix B, pages B-5 to B-8.

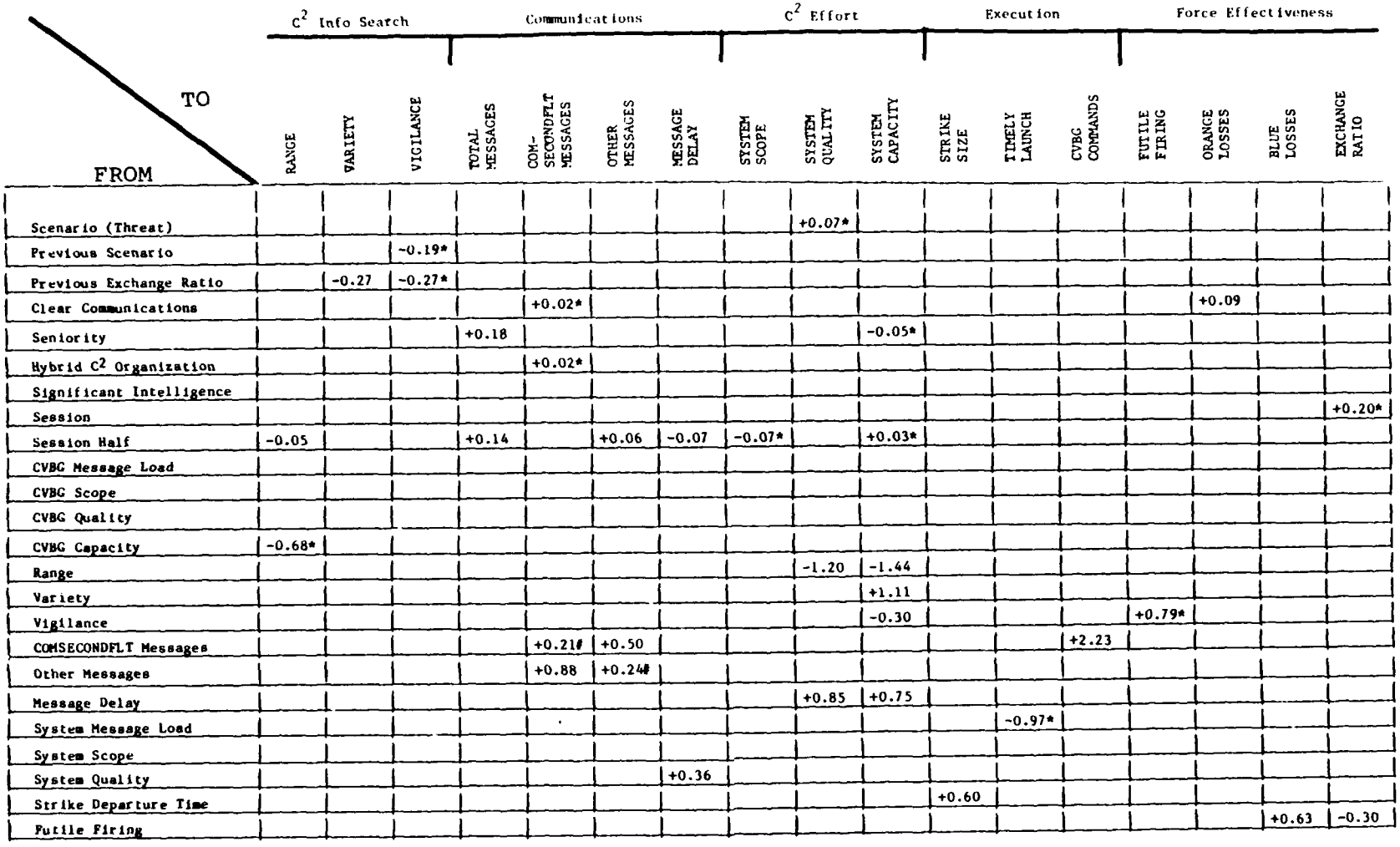

Figure D-1. Causal Influences for Group A

KEY:

*Confidence level less than 95%

#Average node-level coefficient from incoming to outgoing message volume

	C^2 Info Search			Communications				C^2 Effort			Execution			Force Effectiveness			
FROM \ TO	RANGE	VARIETY	VIGILANCE	TOTAL MESSAGES	COM-SECONDFLT MESSAGES	OTHER MESSAGES	MESSAGE DELAY	SYSTEM SCOPE	SYSTEM QUALITY	SYSTEM CAPACITY	STRIKE SIZE	TIMELY LAUNCH	CVBG COMMANDS	FUTILE FIRING	ORANGE LOSSES	BLUE LOSSES	EXCHANGE RATIO
Scenario (Threat)															-0.19		
Previous Scenario	+0.13	+0.20	+0.22														
Previous Exchange Ratio																	
Clear Communications					+0.09											+0.12*	
Seniority	+0.21			+0.38						-0.17							
Hybrid C^2 Organization																	
Significant Intelligence										+0.07							
Session																	
Session Half				+0.19			-0.06	-0.13		-0.13							
CVBG Message Load	-1.02	-0.75															
CVBG Scope	+1.57			+0.68													
CVBG Quality	+1.13*	+0.25*															
CVBG Capacity	-1.94*																
Range																	
Variety										+0.46				-0.95*			
Vigilance														+0.76*			
COMSECONDFLT Messages					+0.47#					+0.55			+1.35				
Other Messages					+0.67	+0.63#						+1.37					
Message Delay										-0.82						-2.58	
System Message Load												-0.97					
System Scope												+1.09					
System Quality																	
Strike Departure Time											+0.36*						
Futile Firing																	-0.13*

Figure D-2. Causal Influences for Group B

KEY:

*Confidence level less than 95%

#Average node-level coefficient from incoming to outgoing message volume

Table D-I. Causal Influences For Group A (Reactive)

- message traffic ⟶ timely launch ⟶ strike size

  A reduction in message traffic leads to an earlier launch time for the strike force. And, as the launch time gets earlier, the size of the strike tends to increase.

- clear comms, hybrid C^2 organization, seniority, message traffic ⟶ message traffic

  Communication clarity and the presence of a hybrid C^2 organization have a small causal influence to increase the amount of message traffic. The higher the seniority at Second Fleet, the more likely message traffic is increased. Also, more messages into a node tend to increase the amount of messages out of the node. (The last influence is confirmed by the node-level estimates.)

- clear comms ⟶ ORANGE losses

  Clear communications slightly increases ORANGE losses.

- C^2 vigilance ⟶ futile firing ⟶ BLUE losses, exchange ratio

  The more active a commander is in viewing the field of battle (i.e., changing radius and center of plot) the more likely he will be to fire when a target is out of range (i.e., probability of hit is zero). And, as a commander increasingly fires when the probability of a hit is zero, BLUE losses tend to increase and the exchange ratio tends to decrease.

- C^2 quality ⟶ message delay ⟶ C^2 quality

  An increase in the quality of the C^2 effort tends to create a message delay, which in turn further increases the C^2 effort quality.

- Scenario, C^2 range ⟶ C^2 quality

  The quality of the C^2 effort is also slightly dependent on the scenario, that is the C^2 effort of Group A has a tendency to increase as the scenario gets harder. The other causal influence on C^2 quality is the range of view of the plot--an increased plot range causes a strong decrease in the C^2 quality.

- seniority, message delay, C^2 info search ⟶ C^2 capacity C^2 range

  Player seniority tends to reduce the capacity of the C^2 effort slightly. Message delay produces increased capacity. All categories of C^2 information search influence C^2 capacity in the following ways:

  - As the range of plot is increased the C^2 capacity is severely decreased; and likewise, as the C^2 capacity increases the range of plot is decreased, but not as strongly;
  - As the variety of ranges increase, so does the C^2 capacity; and
  - As the viewing activity is increased, the C^2 capacity has a tendency to decrease.

- previous exchange ratio ⟶ C^2 variety

  For an increase in the exchange ratio of the previous session (lag), the variety of the C^2 information search tends to decrease.

- previous exchange ratio, previous scenario ⟶ C^2 vigilance

  The exchange ratio lag has the same decreasing influence on C^2 vigilance as above for C^2 variety; however, the simpler the scenario of the previous session the more the vigilance of the C^2 information search seem to increase.

- session ⟶ exchange ratio

  The exchange ratio tends to improve for Blue as successive games are played.

- session half ⟶ C^2 range, message traffic, C^2 effort

  In the second half (i.e., the second "day") of each session, the battle groups tend to reduce their plot range; message traffic among them increases in volume but is read faster; and there is a slight tendency for C^2 capacity to increase, although the scope of the C^2 effort tends to decline.

Table D-2. Causal Influences For Group B (Proactive)

- C^2 scope, message traffic ⟶ timely launch ⟶ strike size

  The scope of the C^2 effort shows a strong positive causal influence on launching a timely strike; that is as the scope broadens, the more likely a strike will be launched on time. As in Group A, the message traffic affects the launch time and the launch time affects the strike size; however, the net effect of increased message traffic is to cause a timelier launch in Group B as opposed to a later launch in Group A.

- clear comms, C^2 scope, seniority, message traffic ⟶ message traffic

  Increased communications clarity, scope of the C^2 effort and player seniority all tend to cause an increase in the volume of message traffic. Also in Group B, as in Group A, the messages coming in to the node tend to increase the message load out.

- Scenario, message delay ⟶ ORANGE losses

  As the scenario becomes easier, ORANGE losses increase.

- message delay, clear comms ⟶ BLUE losses

  BLUE losses for Group B are influenced by other factors than Group A. Increases in message delay cause a significant influence for decreased BLUE losses. Blue losses also tend to increase when communications are clear.

- C^2 info search ⟶ futile firing ⟶ exchange ratio

  Categories of C^2 information search influenced futile firing attempts in the following ways:

  - As the variety of the ranges viewed increased, the futile attempts at firing strongly decreased; and
  - As in Group A, as the vigilance increased so did the futile attempts at firing.

  The futile firing in turn influenced the exchange ratio. As the futile attempts at firing increased, the exchange ratio decreased; the same effect as in Group A.

- seniority, message traffic, message delay, SIGINT, C^2 variety ⟶ C^2 capacity

  Increases in mainstem message traffic or in the C^2 information search variety cause an increase in the capacity of the C^2 effort; but increases in message delay or in player seniority cause a decrease in the capacity. This would suggest that the headquarters has the capacity to perform the C^2 functions as long as the inflow and outflow of messages are being handled; but when message delays start to build, the capacity to perform the C^2 functions degrades as the effort is shifted to reducing message delays. (For Group A, increased message delays influenced an increase in C^2 capacity.) Also, additions of significant intelligence knowledge enhance the C^2 capacity.

- C^2 effort, message traffic, scenario_{t-1}, seniority, ⟶ C^2 range

  All categories of the C^2 effort influence the range of the C^2 information search in the following ways:

- As Group B increases the scope of the C^2 effort, they are also likely to increase the range of view on the plot;
- With an increase in the capacity of the C^2 effort, Group B tends to decrease the range of view (as Group A did); and
- As the quality of the C^2 effort increases, Group B is strongly influenced to increase the range of view.

A decrease in the messages out workload influences a tendency to increase the range of view. The lag of the scenario had a positive influence on the range of search; that is, as the scenario difficulty level of the previous session increased, Group B was influenced to increase the range of the search. Also, the higher the seniority level of the players, the larger the range of view that was selected.

- C^2 quality, $scenario_{t-1}$, *message traffic* $\longrightarrow$ C^2 variety

An increase in the quality of the C^2 effort influences an increase in the variety of the C^2 search. The scenario lag has the same type of effect on variety as range of C^2 information search; increasing difficulty level of the previous scenario influences the search variety to increase. The increasing workload of messages out causes the C^2 information search variety to decrease.

- $Scenario_{t-1}$ $\longrightarrow$ C^2 vigilance

The scenario lag again influences vigilance as with all the C^2 information search categories in Group B; as the difficulty level of the scenario in the previous session increases, the vigilance of the C^2 search increases. However, the opposite was true of vigilance for Group A.

- session half ——→ message traffic, C^2 effort

  In the second half (i.e., the second "day") of each session, message traffic increases in volume but is read faster, and there is a tendency for both C^2 capacity and the scope of the C^2 effort to increase.

SYSTEM-LEVEL REGRESSIONS

PLOTS

.12 $r_p = .39\bar{H} - .05half$
(.18) (.09)

.49 $r_p = -.68n\bar{H} - .05half$
(.20) (.05)

.49 $r_p = -.97 - 1.94n\bar{H} + 1.02wk + 1.57n_{\bar{H}} - .13scen_{t-1} + 1.13\bar{H} + .21senor$
(.09) (.07) (.00) (.04) (.05) (.06) (.02)

.35 $s_p = .28 - .33n_i + .28wk - .19ER_{t-1} + .19\bar{H} - .09scen_{t-1} - .06half$
(.03) (.04) (.06) (.00) (.04) (.01) (.02)

.77 $s_p = .48 - .27ER_{t-1}$
(.00) (.00)

.43 $s_p = .75wk - .20scen_{t-1} + .25\bar{H}$
(.02) (.01) (.09)

.06 $n_p = .46 - .18ER_{t-1}$
(.01) (.17)

.25 $n_p = .45 + .19scen_{t-1} - .29ER_{t-1}$
(.06) (.07) (.07)

.26 $n_p = -.22scen_{t-1}$
(.02)

TRAFFIC

.56 $n_t = .19\bar{n}_H + .12\text{SIGINT} + .28\text{senor} + .15\text{half}$
(.15) (.00) (.00) (.00)

.57 $n_t = .24 + .18\text{senor} + .14\text{half}$
(.02) (.01) (.00)

.44 $n_t = -.15 + .68\bar{n}_H + .38\text{senor} + .19\text{half}$
(.18) (.00) (.00) (.00)

.65 $n_m = .03 + .83n_{ot} + .06\text{comm}$
(.07) (.00) (.00)

.70 $n_m = .88n_{ot} + .02\text{comm} + .02\text{organ}$
(.00) (.15) (.15)

.59 $n_m = .05 + .67n_{ot} + .09\text{comm}$
(.11) (.00) (.00)

.67 $n_{ot} = .05\text{half} + .05\text{senor} + .50n_m$
(.01) (.11) (.00)

.78 $n_{ot} = .06\text{half} + .50n_m$
(.01) (.00)

.60 n_{ot} = no significant relationship

DELAY

.26 $\bar{t}_i = .99 + .06\text{half} - .19\bar{H}$
(.00) (.00) (.03)

.32 $\bar{t}_i = 1.06 + .07\text{half} - .36\bar{H}$
(.00) (.02) (.01)

.48 $\bar{t}_i = .91 + 06\text{half}$
(.00) (.00)

PERFORMANCE

.26 $n_{\bar{H}} = .57 - .09\text{half} + .23n_{ot}$
(.00) (.00) (.14)

.15 $n_{\bar{H}} = .56 - .07\text{half}$
(.00) (.06)

.39 $n_{\bar{H}} = .59 - .13\text{half}$
(.00) (.00)

.21 $\bar{H} = .84 - .36\bar{t}_i$
(.00) (.14)

.63 $\bar{H} = 1.67 - 1.20r_p - .07\text{scen} - .85\bar{t}_i$
(.00) (.00) (.20) (.00)

.33 $\bar{H} = .22 + .33n_m$
(.00) (.21)

.32 $n\bar{H} = .65 + .41s_p + .32n_m - .29\bar{t}_i - .40r_p$
(.00) (.08) (.09) (.11) (.08)

.85 $n\bar{H} = 1.34 - 1.44r_p - .30n_p - .75\bar{t}_i + 1.11s_p - .05senor + .03half$
(.00) (.00) (.00) (.00) (.12) (.14)

.89 $n\bar{H} = -.54 + .55n_m + .46s_p - .17senor + .82\bar{t}_i + .07SIGINT - .13half$
(.00) (.01) (.00) (.01) (.00) (.00)

EXECUTION

.21 $Q = .13 + .49t_Q$
(.03) (.00)

.32 $Q = .60t_Q$

.10 $Q = .23 + .36t_Q$
(.04) (.08)

.02 t_Q = no significant relationship

.00 t_Q = no significant relationship

.01 t_Q = no significant relationship

.13 $t_1 = .86n_{ot} + .71n_{\bar{H}} + .49wk$
(.03) (.05) (.15)

.14 $t_1 = .97wk$
(.09)

.39 $t_1 = 1.37n_{ot} + 1.09n_{\bar{H}} + 97wk$
(.01) (.01) (.03)

.39 $n_c = 1.50n_m - .11SIGINT$
(.00) (.05)

.71 $n_c = 2.23n_m$
(.00)

.63 $n_c = 1.35n_m + .07SIGINT$
(.00) (.23)

.25 $PH_o = .76 + .91s_p - .76n_p$

.21 $PH_o = .83 - .97n_p$
(.18) (.09)

.29 $PH_o = .74 + .95s_p - .76n_p$
(.02) (.13) (.07)

.32 $Q_o = -.50 + .11scen + .69\bar{t}_i$
(.21) (.04) (.04)

.53 $Q_o = .08comm$
(.05)

.34 $Q_o = .19scen$
$(.05)^5$

.22 $Q_B = 1.14 - .57\bar{t}_i - .07comm + .35PH_o$
(.01) (.19) (.18) (.00)

.63 $Q_B = .43 + .63PH_o$
(.20) (.00)

.21 $Q_B = 3.37 - 2.28\bar{t}_i - .12comm$
(.00) (.02) (.18)

.21 $ER = .66 + .15sess + .24PH_o$
(.00) (.04) (.00)

.24 $ER = .57 + .20sess + .30PH_o$
(.00) (.08) (.02)

.12 $ER = .81 + .13PH_o$
(.00) (.12)

NODE-LEVEL REGRESSIONS

PLOTS

.18 $cr_p = .41 - .35c\bar{t}_i - .04organ + .27wk_c$
(.02) (.05) (.12) (.02)

.36 $cr_p = -.05organ + .59wk_c$
(.20) (.00)

.14 $cr_p = .40 - .08SIGINT$
(.15) (.09)

.03 $cs_p = .10 - .03organ$
(.00) (.17)

.16 $cs_p = .10 - .04organ$
(.00) (.06)

.00 cs_p = no significant relationship

.06 $cn_p = .60 - .25ER_{t-1}$
(.00) (.07)

.24 $cn_p = .69 - .37ER_{t-1}$
(.00) (.01)

.01 cn_p = no significant relationship

.24 $jr_p = 1.07 - .09half - .40ER_{t-1} - .14scen_{t-1} - .36jn_i$
(.00) (.10) (.02) (.10) (.05)

.75 $jr_p = 1.10 - .61ER_{t-1} - .34jn_i$
(.00) (.00) (.07)

.19 $jr_p = - .21scen_{t-1}$
(.23)

.22 $js_p = .48 + 27n\bar{H}_j - .43ER_{t-1} - .10scen_{t-1}$
(.00) (.07) (.00) (.19)

.77 $js_p = .65 - .63ER_{t-1}$
(.00) (.00)

.44 $js_p = .77n\bar{H}_j$
(.00)

.36 $jn_p = .98 - .52jn_i + .21senor - .23SIGINT - .14scen_{t-1}$
(.00) (.01) (.06) (.00) (.09)

.26 $jn_p = .81 - 46jn_i + .17scen_{t-1} - .12organ$
(.01) (.19) (.22) (.16)

$$.68 \quad jn_p = \underset{(.00)}{.98} + \underset{(.11)}{.23}senor - \underset{(.00)}{.39}scen_{t-1} - \underset{(.00)}{.23}SIGINT - \underset{(.17)}{.32}jn_i$$

$$.21 \quad sr_p = \underset{(.06)}{.70}jn_{\bar{H}} - \underset{(.03)}{.36}ER_{t-1} - \underset{(.03)}{.13}scen - \underset{(.04)}{.98}n\bar{H}j + \underset{(.07)}{EPU_{t-1}}$$

$$.16 \quad sr_p = \text{no significant relationship}$$

$$.36 \quad sr_p = - .15scen - .48ER_{t-1}$$

$$.22 \quad ss_p = \underset{(.00)}{.18} + \underset{(.06)}{.13}sn_{\bar{H}} - \underset{(.10)}{.15}n\bar{H}_s - \underset{(.00)}{.15}ER_{t-1}$$

$$.24 \quad ss_p = \underset{(.02)}{.15} + \underset{(.12)}{14}sn_H - \underset{(.19)}{.15}n\bar{H}_s - \underset{(.03)}{.12}ER_{t-1}$$

$$.26 \quad ss_p = \underset{(.01)}{.36} - \underset{(.01)}{.33}ER_{t-1}$$

$$.46 \quad sn_p = \underset{(.00)}{.83} - \underset{(.00)}{.12}SIGINT + \underset{(.00)}{.27}senor - \underset{(.00)}{.72}sn_i$$

$$.55 \quad sn_p = \underset{(.00)}{.92} + \underset{(.00)}{.35}senor - \underset{(.01)}{.80}sn_i$$

$$.57 \quad sn_p = \underset{(.00)}{.96} - \underset{(.05)}{.08}organ - \underset{(.00)}{.98}sn_i$$

TRAFFIC

.37 $cn_i = .55 - .17senor + .34cn_o$
(.00) (.00) (.03)

.50 $cn_i = .71 - .07half - .16senor$
(.00) (.10) (.01)

.56 $cn_i = .38 - .31senor - .10scen + .08SIGINT + .45cn_o$
(.04) (.00) (.09) (.07) (.02)

.52 $cn_o = .69 - .12senor - .11half - .05comm + .24cn_i$
(.00) (.02) (.00) (.03) (.03)

.63 $cn_o = .76 - .13half - .10senor$
(.00) (.00) (.12)

.53 $cn_o = .56 - .07comm - .09half + .42cn_i$
(.00) (.09) (.02) (.02)

.80 $jn_i = .34 - .06half - .08senor - .05comm + .56jn_o$
(.00) (.01) (.06) (.01) (.00)

.78 $jn_i = -.06half + .85jn_o$
(.02) (.00)

.82 $jn_i = .38 - .13senor - .06half - .09comm + .06scen + .50jn_o$
(.00) (.08) (.11) (.01) (.19) (.00)

.74 $jn_o = .04comm - .06scen + 1.03jn_i$
(.14) (.12) (.00)

.79 $jn_o = .30 - .12senor + .73jn_i$
(.01) (.01) (.00)

.77 jn_o = .08comm − .11scen + .99jn_i
(.10) (.07) (.00)

.54 sn_i = .69 − .09senor − .09SIGINT − .07half + 19sn_o
(.00) (.03) (.00) (.00) (.06)

.54 sn_i = .84 − .11half − .13senor
(.00) (.00) (.01)

.49 sn_i = .58 − .05SIGINT + .26sn_o
(.00) (.15) (.07)

.44 sn_o = .64 − .07half − .15senor + .33sn_i
(.00) (.01) (.01) (.06)

.34 sn_o = .88 − .08half − .13senor
(.00) (.08) (.07)

.54 sn_o = .50 − .22senor − .08half + .48sn_i
(.03) (.03) (.09) (.07)

.30 tn_i = .95 − .16senor − .08half − .06scen
(.00) (.00) (.00) (.13)

.37 tn_i = 1.14 − .09half − .10scen
(.00) (.01) (.06)

.52 tn_i = .79 − .37senor − .12scen − .07half
(.01) (.00) (.09) (.09)

.10 tn_o = .81 - .07senor - .04SIGINT
(.00) (.13) (.16)

.13 tn_o = 1.03 - .06half
(.00) (.13)

.35 tn_o = .82 - .15senor
(.06) (.00)

.57 fn_i = .59 - .07comm - .23senor - .14half + .08scen + .28fn_o
(.00) (.05) (.00) (.00) (.13) (.02)

.43 fn_i = .47 - .26senor + .12scen - .09comm + .37fn_o
(.05) (.01) (.14) (.11) (.15)

.68 fn_i = .57 - .09comm - .20half + .39fn_o
(.00) (.10) (.00) (.03)

.54 fn_o = .53 - .11senor - .05comm - .18SIGINT - .07scen + .35fn_i
(.00) (.16) (.22) (.00) (.20) (.02)

.42 fn_o = .71 - .09half - .11scen - .21fn_i
(.00) (.02) (.09) (.15)

.58 fn_o = .31 - .26senor + .41fn_i
(.10) (.05) (.03)

DELAY

.07 $c\bar{t}_i = .83 + .16wk_c$
(.00) (.06)

.16 $c\bar{t}_i = 1.08 - .35wk_c$
(.00) (.03)

.38 $c\bar{t}_i = .75 + .34wk_c$
(.00) (.00)

.28 $j\bar{t}_i = .79 + 06senor + .06half$
(.00) (.03) (.00)

.08 $j\bar{t}_i$ = no significant relationship

.51 $j\bar{t}_i = .77 + .08senor + .10half$
(.00) (.08) (.00)

.15 $st_i = .84 + .05half$
(.00) (.00)

.15 $s\bar{t}_i$ = no significant relationship

.22 $s\bar{t}_i = .75 + .09senor + .06half$
(.00) (.12) (.02)

.10 $t\bar{t}_i = 1.06 - .19wk_t - .18senor + .06half$
(.00) (.20) (.04) (.21)

.30 $t\bar{t}_i = 1.07 - .65wk_t - .25senor + .14half$
(.04) (.04) (.08) (.12)

.52 $\bar{tt}_i$ = .71 + .29wk_t + .07senor

.19 $\bar{ft}_i$ = .88 − .15senor + .10half + .05organ
(.00) (.06) (.02) (.18)

.41 $\bar{ft}_i$ = .57 − .17senor + .14half + .15organ
(.01) (.18) (.06) (.02)

.22 $\bar{ft}_i$ = .87 + .10fn_i + .05half
(.00) (.21) (.04)

PERFORMANCE

.50 $\bar{H}_c$ = .95 − .59cr_p + .23SIGINT + .91cs_p − .07organ + .17cn_p
(.01) (.05) (.00) (.02) (.13) (.21)

.29 $\bar{H}_c$ = no significant relationship

.80 $\bar{H}_c$ = 1.01 − 1.19cr_p − .31senor + .24SIGINT + 1.33cs_p + .22cn_p − .62$cn_{\bar{H}}$
(.00) (.00) (.00) (.00) (.00) (.08) (.00)

.43 $cn_{\bar{H}}$ = 1.27 − .47$\bar{ct}_i$ + .06organ − .20scen − .33senor
(.00) (.07) (.14) (.00) (.00)

.53 $cn_{\bar{H}}$ = 1.63 − 2.27cs_p − .80$\bar{ct}_i$ − .46senor − .31scen
(.00) (.08) (.13) (.00) (.01)

.72 $cn_{\bar{H}}$ = 1.35−1.19cr_p+.21SIGINT+.24cn_p−.10scen−.40sencr−.10half+ 1.14cs_p−.77$\bar{H}_c$
(.00) (.00) (.00) (.08) (.16) (.00) (.10) (.01) (.00)

.60 $n\bar{H}_c$ = .79 − .46cr_p + .19SIGINT − .41$\bar{ct}_i$ − .20senor − .09scen + .50cs_p
(.00) (.02) (.00) (.03) (.00) (.05) (.04)

$$.47 \quad n\bar{H}_c = \underset{(.00)}{1.30} - \underset{(.19)}{1.32cs_p} - \underset{(.04)}{.18scen} - \underset{(.00)}{.29senor} - \underset{(.03)}{.85c\bar{t}_i}$$

$$.78 \quad n\bar{H}_c = \underset{(.02)}{.50} - \underset{(.00)}{.81cr_p} - \underset{(.17)}{.05half} - \underset{(.00)}{.27senor} + \underset{(.00)}{.17SIGINT} + \underset{(.13)}{.78cs_p} + .14cn_p$$

$$.14 \quad \bar{H}_j = \underset{(.14)}{.78} - \underset{(.04)}{.14SIGINT}$$

$$.27 \quad \bar{H}_j = \underset{(.12)}{1.32} + \underset{(.13)}{.20scen} - \underset{(.37)}{.21j\bar{n}_{\bar{H}}}$$

$$.32 \quad \bar{H}_j = \underset{(.15)}{+.13comm} + \underset{(.12)}{.15half}$$

$$.33 \quad j\bar{n}_{\bar{H}} = \underset{(.02)}{1.18} + \underset{(.12)}{52js_p} - \underset{(.02)}{.16SIGINT} - \underset{(.19)}{.64j\bar{t}_i} + \underset{(.08)}{.14scen} + \underset{(.08)}{.09comm} + \underset{(.08)}{.18senor}$$

$$.30 \quad j\bar{n}_{\bar{H}} = \underset{(.17)}{1.20} - \underset{(.17)}{.26jn_p}$$

$$.63 \quad j\bar{n}_{\bar{H}} = \underset{(.11)}{.67js_p} + \underset{(.08)}{.23scen}$$

$$.37 \quad n\bar{H}_j = \underset{(.07)}{.70} + \underset{(.05)}{.53js_p} - \underset{(.00)}{.17SIGINT} + \underset{(.02)}{.19senor} - \underset{(.17)}{.34jr_p} + \underset{(.06)}{.12scen}$$

$$.26 \quad n\bar{H}_j = \text{no significant relationship}$$

$$.63 \quad n\bar{H}_j = .80 + .60js_p + .28senor - .13SIGINT + .15scen + .10comm$$
$$(.16) \quad (.07) \quad (.12) \quad (.08) \quad (.15) \quad (.15)$$

$$.36 \quad \bar{H}_s = .96 - .21scen - .14senor - .10comm - .14sn_{\bar{H}}$$
$$(.01) \quad (.00) \quad (.13) \quad (.02) \quad (.21)$$

$$.33 \quad \bar{H}_s = -.18scen$$
$$(.12)$$

$$.55 \quad \bar{H}_s = 1.12 - .59sr_p - .39senor + .18comm - .40scen - .19sn_{\bar{H}}$$
$$(.05) \quad (.14) \quad (.02) \quad (.03) \quad (.01) \quad (.21)$$

$$.37 \quad sn_{\bar{H}} = .73 - .38sn_p - .12SIGINT + 08organ - .10half - .23\bar{H}_s$$
$$(.15) \quad (.06) \quad (.05) \quad (.14) \quad (.07) \quad (.21)$$

$$.43 \quad sn_{\bar{H}} = +.22 - .44sn_p - .10half$$
$$(.14) \quad (.09) \quad (.17)$$

$$.42 \quad sn_{\bar{H}} = -.37scen + .20comm - .91sr_p - .46\bar{H}_s$$
$$(.12) \quad (.14) \quad (.14) \quad (.21)$$

$$.29 \quad n\bar{H}_s = -.17scen - .06half - .07SIGINT - .34sr_p - .29sn_p$$
$$(.01) \quad (.16) \quad (.43) \quad (.14) \quad (.09)$$

$$.31 \quad n\bar{H}_s = -.18scen - .33sn_p$$
$$(.06) \quad (.13)$$

$$.40 \quad n\bar{H}_s = -.26senor - .31scen - .74sr_p - .15comm$$
$$(.16) \quad (.04) \quad (.11) \quad (.10)$$

$$.22 \quad \bar{H}_t = .50t\bar{t}_i + 25scen - .16organ + .39tn_{\bar{H}}$$
$$(.05) \quad (.03) \quad (.03) \quad (.15)$$

$$.40\ \bar{H}_t = -.92 + 1.07t\bar{t}_i - .33\text{organ} + .44\text{scen} + .91t\bar{n}_H$$
$$(.08)\quad (.00)\qquad (.02)\qquad (.06)\qquad (.23)$$

$$.45\ \bar{H}_t = .11\text{half} - .12\text{SIGINT} + .13\text{comm} + .38t\bar{n}_H$$
$$(.21)\qquad (.14)\qquad (.15)\qquad (.08)$$

$$.30\ t\bar{n}_H = .64 - .35t\bar{t}_i - .09\text{half} - .14\text{senor} + .12\bar{H}_t$$
$$(.00)\quad (.01)\qquad (.02)\qquad (.08)\quad (.15)$$

$$.44\ t\bar{n}_H = .60 - .27t\bar{t}_i - .07\text{half} - .10\text{scen}$$
$$(.00)\quad (.02)\qquad (.05)\qquad (.07)$$

$$.48\ t\bar{n}_H = -.15\text{comm} + .15\text{SIGINT} - .19\text{half} + .44\bar{H}_t$$
$$(.12)\qquad (.08)\qquad (.03)\qquad (.08)$$

$$.19\ n\bar{H}_t = -.04\text{organ} - 04\text{half} + .10\text{scen}$$
$$(.17)\qquad (.19)\qquad (.04)$$

$$.25\ n\bar{H}_t = -.08\text{organ} + .14\text{scen} + .22t\bar{t}_i$$
$$(.11)\qquad (.08)\qquad (.04)$$

$$.35\ n\bar{H}_t = .16\text{scen} - .08\text{half}$$

$$.36\ \bar{H}_f = .22 + .12\text{half} + .19\text{senor} - .12\text{organ} + .19f\bar{n}_H$$
$$(.18)\quad (.01)\qquad (.04)\qquad (.01)\qquad (.10)$$

$$.32\ \bar{H}_f = -.15\text{organ} + .23\text{senor}$$
$$(.14)\qquad (.16)$$

$$.29\ \bar{H}_f = .14\text{half} + .22f\bar{n}_H$$
$$(.05)\qquad (.17)$$

.22 $fn_{\bar{H}} = .51 - .14half + .25\bar{H}_f$
(.00) (.01) (.10)

.16 $fn_{\bar{H}} = .54 - .17organ$

.42 $fn_{\bar{H}} = 1.50 - .21half - .17scen + .36\bar{H}_f$
(.05) (.02) (.18) (.17)

.28 $n\bar{H}_f = .21 + .23senor - .13organ$
(.14) (.01) (.00)

.32 $n\bar{H}_f = -.17organ + .20senor$

.28 $n\bar{H}_f$ = no significant relationship

EXECUTION

.36 $PH_c = .86 + .32cr_p - .05comm - .38cn_p + .05organ$
(.00) (.18) (.16) (.00) (.18)

.50 $PH_c = .94 + .41\bar{H}_c + .13organ - .10comm - .51cn_p$
(.00) (.14) (.05) (.15) (.01)

.46 $PH_c = -.25cn_p - .57cs_p$
(.03) (.15)

.41 $PH_j = 1.54 - 1.17jn_{\bar{H}} - .91\bar{H}_j - .11SIGINT + .09organ - 18jn_p + 08comm + 1.74n\bar{H}_j$
(.00) (.01) (.01) (.02) (.02) (.03) (.05) (.00)

.50 $PH_j = .57 + .04organ$
(.09) (.12)

.65 $PH_j = 2.06 - 1.97jn_{\bar{H}} - .93js_p + .11comm - 2.12\bar{H}_j + .80jr_p - .38jn_p - .12scen + 3.86n\bar{H}_j$
(.00) (.01) (.07) (.16) (.00) (.06) (.01) (.20) (.00)

.18 $PH_s = .87 - .46sn_p$
(.02) (.01)

.24 $PH_s = -.54sn_p$
(.12)

.25 $PH_s = 1.22 - .31sn_p - .14scen$
(.00) (.16) (.15)

.35 $EPU_c = .68 - 1.10cs_p + .29PH_c + .52cr_p - .06scen$
(.00) (.00) (.02) (.01) (.22)

.35 $EPU_c = .49 + .39PH_c$
(.01) (.01)

.55 $EPU_c = 1.00 - .132\ cs_p - .20cn_p + 63cr_p - .13scen$
(.00) (.00) (.15) (.06) (.06)

.09 $EPU_j = .95 + .24jr_p - .35js_p$
(.00) (.19) (.08)

.12 $EPU_j = 1.13 + .08scen$
(.00) (.15)

.19 $EPU_j = .97 - .41js_p$
(.00) (.18)

.17 $EPU_s = .84 + .10PH_s + .04scen$
(.00) (.01) (.08)

.25 $EPU_S = .81 + .13PH_S$
(.00) (.03)

.20 $EPU_S = .94 + 05scen$
(.00) (.03)


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